

Chapter 4

Research Results

Description of Variables

1. Explained variables

Whether the enterprise engages in foreign direct investment (OFDI) is the focus of this research. The sample in this study includes both enterprises that have made foreign direct investment and those that have not. Since specific data on the scale of foreign direct investment is not available, this research uses whether enterprises engage in overseas direct investment (OFDI) as the dependent variable. It should be noted that this study does not differentiate between different investment behaviors of the same enterprise in multiple countries or within the same country. The dependent variable is coded as 1 if the enterprise has engaged in foreign direct investment in the current year and 0 if it has not. The definition of enterprises with direct investment refers to overseas enterprises where domestic investors directly own or control 10% or more of the voting rights or equivalent interests, as stated in the Statistical Communique on Foreign Direct Investment. To determine whether an enterprise has engaged in OFDI in a specific year, the information of its overseas affiliated companies in the overseas investment database of Guotai 'an is used. In this paper, the relevant relationships considered are subsidiaries, associated companies, and joint venture companies. If an enterprise is registered outside mainland China and holds 10% or more shares, it is considered to have engaged in overseas investment in the same year.

2. Explanatory variables

The enterprise financing structure is assessed using the debt-to-equity ratio (DEV), which represents the ratio of debt financing to equity financing. A smaller value indicates a financing structure that favors equity financing, while a larger value indicates a financing structure that favors debt financing. Debt financing (DF) refers to the acquisition of funds through borrowing activities and is calculated as the sum of bonds payable, short-term loans, and long-term loans divided by total assets. Equity financing (EF) refers to the financing obtained through equity transactions and is calculated as the sum of equity and capital reserves divided by total assets.

3. Control variables

Enterprise Size (Size): This variable represents the logarithm of the total assets of an enterprise and is used to measure the size of the enterprise. A larger enterprise is more likely to choose foreign direct investment (FDI) as it can better overcome various risks in production, operation, and the import-export process.

Return on assets (Roa): This variable measures the ratio of net profit to total assets and is used to assess the earning ability of enterprises. A stronger earning ability indicates a more effective operation and management of the enterprise, which is beneficial for undertaking overseas direct investment.

Liquidity ratio (Lr): This variable represents the ratio of a company's current assets to its current liabilities. It measures the ability of an enterprise to pay its short-term debts. A higher ratio indicates a stronger short-term debt-paying ability, which is conducive to improving the enterprise's ability to engage in foreign direct investment.

Capital intensity (K): This variable represents the logarithm of the ratio of the total fixed assets of an enterprise to the number of employees. Based on the research by Li and Bao (2015, pp.120-131) using Chinese enterprise-level data, capital intensity promotes foreign direct investment (OFDI).

Corporate profitability (Profit): This variable represents the ratio of corporate operating profit to total operating revenue. A stronger profitability indicates a lower financing constraint, which is conducive to the enterprise's foreign direct investment activities.

Growth ability of the enterprise (TobinQ): This variable, calculated as $(\text{total capital stock} - \text{B shares of foreign capital listed in China}) * \text{current closing price of A shares} + \text{B shares of foreign capital listed in China} * \text{current closing price of B shares} * \text{ratio of the exchange rate on that day}$ to total assets of the enterprise, reflects the growth prospects of enterprises.

Administrative cost per capita (M): This variable represents the logarithm of the ratio of administrative expenses to the number of employees and reflects the degree of specialization in internal management. The level of management specialization within an enterprise is an important factor affecting enterprise competition. An increase in management cost helps enterprises overcome the negative effects of production (Shunqi & Shuzhen, 2013, pp.55-66), thus facilitating their foreign direct investment activities.

The results of descriptive statistical analysis of the samples are presented in Table 4.1

Table 4.1 Results of descriptive statistical analysis of the samples.

Variable	Mean Value	Standard deviation	Min. Value	Max. Value
Direct Oversea Investment	0.4560	0.4981	0.0000	1.0000
Financing structure (debt-equity ratio)	0.9441	1.6419	-12.6187	38.8795
Enterprise size (against value)	22.3982	1.3705	16.1847	28.6365
Return on assets	0.0350	0.0722	-1.7026	2.6372
Liquidity ratio	2.4181	4.1022	0.0385	204.7421
Capital intensity (against value)	12.6186	1.2152	4.1274	19.5426
Profitability	0.0711	0.8162	-78.5174	28.5664
Growth ability	2.0147	1.6299	0.6735	48.2704
Administrative cost per capita (against value)	11.1785	0.7556	7.3438	15.7434

The average overseas investment of enterprises in the table is 0.4560, indicating that more than 40 percent of the sample enterprises have engaged in overseas direct investment. Additionally, the average debt-to-equity ratio is 0.9441, suggesting that equity financing is more significant than debt financing. However, it is worth noting that the minimum value of the debt-to-equity ratio is -12.6187. This negative value arises from a listed enterprise in the sample having a negative capital reserve due to internal accounting treatment. Consequently, the negative reserve leads to negative equity financing, resulting in a negative debt-to-equity ratio.

Empirical regression

Before conducting the regression analysis, a correlation test and VIF (Variance Inflation Factor) test were performed on the main variables to examine the presence of significant collinearity. Typically, collinearity is considered serious when the correlation coefficient between variables exceeds 0.8. From the table, it can be observed that the maximum correlation coefficient between variables is 0.4529, and the maximum VIF is 1.56, which is less than 10. Therefore, it can be concluded that there is no significant systematic multicollinearity, as shown in Table 4.2

Table 4.2 Correlation coefficient between variables

Variable	DEV	Lnize	Roa	Lr	Lnk	Profit	TobinQ	LnM
DEV	1.0000							
Lnize	0.4529	1.0000						
Roa	0.0939	0.0113	1.0000					
Lr	-0.1626	-0.2376	0.1034	1.0000				
Lnk	0.1627	0.3073	0.0582	-0.1456	1.0000			
Profit	-0.0033	0.0391	0.2114	0.0086	0.0096	1.0000		
TobinQ	-0.2031	-0.3794	0.1084	0.1069	-0.1650	-0.0256	1.0000	
LnM	0.0672	0.1010	-0.0263	0.0439	0.2243	-0.0069	0.0617	1.0000
VIF	1.28	1.56	1.09	1.09	1.17	1.05	1.21	1.08

1. Baseline regression

The Probit model was used to regress the benchmark measurement equation (4.1), and the regression results are presented in Table 4.3. In column (1), the regression is conducted on the financing structure and overseas direct investment behavior without considering other enterprise conditions. The results show that DEV is significantly positive at the 1% level, indicating that debt financing in the financing structure is more favorable for enterprise OFDI. However, since no control variables are added to the model at this stage, the Pseudo-R² is only 0.0022, indicating a poor fit of the model.

Columns (2) to (4) present the regression results of the financing structure and enterprises' overseas direct investment behavior after adding control variables and gradually controlling for the year and regional effects. Column (4) is listed as the final baseline model, and column (5) represents its marginal impact. The results from columns (2) to (4) consistently show that the financing structure is significantly negatively correlated with whether an enterprise conducts overseas FDI at the 1% level.

This indicates a reverse relationship between the financing structure and the enterprise's overseas direct investment. In other words, the more the enterprise's financing structure favors equity financing, the more likely it is for the enterprise to engage in overseas investment behavior. The marginal effect estimates after mixed regression in column (5) reveal that, holding other conditions constant, a decrease of 1 unit in the financing structure index leads to a 2.56% increase in the probability of overseas investment by enterprises.

Table 4.3 The influence of financing structure on enterprises' overseas direct Investment

	(1)	(2)	(3)	(4)	(5)
	OFDI	OFDI	OFDI	OFDI	margins
DEV	0.051*** (8.882)	-0.072*** (11.001)	-0.054*** (-8.106)	-0.057*** (-8.191)	-0.0256*** (0.00234)
Lnsiz		0.383*** (41.186)	0.383*** (34.377)	0.317*** (21.997)	0.137*** (0.00310)
Roa		-0.738*** (-5.209)	-0.296*** (-2.071)	-0.582*** (-3.915)	-0.255*** (0.0492)
Lr		-0.001 (-0.332)	0.002 (0.902)	0.002 (0.687)	-0.000375 (0.000866)
Lnk		-0.163*** (-19.076)	-0.166*** (-19.351)	-0.110*** (-11.152)	-0.0587*** (0.00303)
Profit		-0.016 (-1.340)	-0.021* (-1.801)	-0.032*** (-2.667)	-0.00553 (0.00427)
TobinQ		0.026*** (3.879)	0.017*** (2.442)	0.029*** (4.025)	0.00936*** (0.00230)
LnM		0.130*** (9.982)	0.106*** (8.019)	0.042*** (2.820)	0.0473*** (0.00468)
Constant Term	-0.180*** 16.958	-8.087*** (-33.810)	-7.168*** (-28.705)	-8.108*** (-29.525)	-2.387*** (0.0815)
Year fixed effect	No	No	Yes	Yes	Yes
Regional fixed effect	No	No	No	Yes	Yes
Pseudo R2	0.0031	0.0863	0.1024	0.1590	-
Sample size	18975	18975	18975	18975	18975

Combined with the results in Table 4.3, Hypothesis 1 can be confirmed: the external financing structure of an enterprise has an impact on its overseas direct investment, and a smaller debt-equity ratio is associated with a higher likelihood of overseas investment.

Regarding the control variables, the regression results indicate a positive correlation between enterprise size and overseas investment, suggesting that larger enterprises are more likely to engage in overseas investment. The future growth ability of enterprises also has a significant positive effect on overseas investment, implying that enterprises with better growth prospects are more inclined to conduct

overseas investment. The coefficient of the enterprise's internal management level is significantly positive at the 1% level, indicating that an improvement in the enterprise's management level promotes the occurrence of overseas direct investment, aligning with the expected direction.

Surprisingly, the return on assets of enterprises is significantly negative at the 1% level, contrary to the expected sign. Similarly, the profitability of enterprises exhibits a negative correlation with their overseas investment behavior at the 1% level, contradicting the expected direction. This suggests that, under favorable domestic market conditions, enterprises may prioritize expanding their presence in the domestic market rather than venturing into international markets.

The liquidity ratio of enterprises has a small and insignificant coefficient, indicating that the short-term solvency of enterprises does not significantly impact their overseas direct investment behavior.

2. Robustness test

1) Replace the model

There are several methods for conducting robustness tests, such as changing variables or estimation models. In Table 4.4, column (1) presents the regression results of a mixed Logit model, while column (2) displays the results of a random effects regression using panel Probit. Both regression results demonstrate a negative effect of financing structure on enterprises' overseas direct investment. Although the significance level of the regression results using the panel Probit random effects model is only 10%, the coefficient remains negative and significant, thus ensuring the robustness of the model. Additionally, the coefficients of the control variables did not experience substantial changes.

Table 4.4 Robustness test

	(1)	(2)
	OFDI	OFDI
DEV	-0.097***	-0.033*
	(-8.196)	(-1.820)
Lnsize	0.618***	0.959***
	(34.863)	(20.962)
Roa	-0.883***	-1.397***
	(-3.477)	(-4.473)

Table 4.4 Robustness test (Cont.)

	(1)	(2)
	OFDI	OFDI
Lr	0.000	-0.023***
	(0.011)	(-3.408)
Lnk	-0.217***	-0.120***
	(-14.237)	(-3.524)
Profit	-0.046**	-0.025
	(-2.173)	(-0.889)
TobinQ	0.047***	-0.022
	(4.018)	(-1.186)
Ln _m	0.098***	0.237***
	(4.092)	(4.862)
Constant Term	-13.426***	-24.666***
	(-28.796)	(-20.961)
Year fixed effect	Yes	Yes
Regional fixed effect	Yes	Yes
Pseudo R2	0.1508	—
Sample size	18975	18975

2) Variable Change:

Next, the approach of changing the explanatory or explained variables will be employed. Firstly, the explanatory variable "financing structure" will be altered. Different studies propose various measurement methods for corporate financing structure. Referring to Song & Miao (2023), it is suggested that the longer the experience and cycle of enterprises' overseas direct investment activities, the higher the likelihood of long-term borrowing. Therefore, the calculation formula for debt financing will be changed to "long-term borrowing/total assets". Consequently, the calculation of the debt-to-equity ratio will also be modified. As observed from the results in column (1) of Table 4.5, the regression coefficient of the new debt-to-equity ratio (DEVN) remains significantly negative after the change in calculation method. Additionally, the regression coefficients of the other control variables have not undergone significant changes. This implies that the research hypothesis of this paper still holds, the empirical results remain consistent, and the model's robustness is upheld.

Furthermore, by altering the measurement method of the explained variable, the analysis of enterprises' overseas direct investment can be approached from a scale perspective. Although it is challenging to obtain the precise amount of enterprises' overseas direct investment, this paper employs the number of enterprises' overseas investments (OFDITIMES) as a proxy variable to reflect the scale of their overseas investments (Li & Bao, 2015, pp.120-131). Since the number of overseas direct investments is a non-negative integer, and the variance of OFDITIMES exceeds the mean significantly, a negative binomial regression model is utilized for estimation. The specific results are presented in column (2) of Table 4.5. The impact of financing structure on the number of overseas investments remains negative. Simultaneously, when explanatory variables, explained variables, and models are changed, the regression result is displayed in column (3) of Table 4.5. The new regression outcomes affirm that the influence of financing structure on enterprises' overseas direct investment remains negative. This indicates that a higher proportion of equity financing in the financing structure facilitates enterprises' overseas direct investment. Consequently, the robustness of the model is verified.

Table 4.5 Result Analysis of Change variables

	(1) OFDI	(2) OFDITIMES	(3) OFDITIMES
DEV		-0.037*** (-4.155)	
DEVN	-0.171*** (-14.939)		-0.085*** (-5.110)
Lnsiz	0.390*** (38.398)	0.327*** (19.060)	0.329*** (19.476)
Roa	-0.528*** (-3.594)	-0.479*** (-3.829)	-0.465*** (-3.707)
Lr	0.001 (0.467)	-0.016*** (-3.795)	-0.015*** (-3.594)
Lnk	-0.131*** (-14.132)	-0.081*** (-5.272)	-0.080*** (-5.219)
Profit	-0.027** (-2.249)	0.003 (0.148)	0.03 (0.178)
TobinQ	0.028*** (3.958)	-0.019** (-2.167)	-0.018** (-2.069)

Table 4.5 Result Analysis of Change variables (Cont.)

	(1) OFDI	(2) OFDITIMES	(3) OFDITIMES
Ln _{it}	0.075*** (5.180)	0.090*** (4.654)	0.089*** (4.614)
Constant Term	-8.646*** (-31.448)	-6.575*** (-15.469)	-6.664*** (-15.755)
Year fixed effect	Yes	Yes	Yes
Regional fixed effect	Yes	Yes	Yes
Pseudo R ²	0.1642	—	—
Sample size	18975	18975	18975

3) Instrumental variable regression

Some financial institutions assess the repayment ability of enterprises by considering their fixed assets and cash flow levels when providing loans. Moreover, due to the long-term nature of overseas investment projects, there may be a certain consideration period, and the current financing structure may impact the subsequent phases of overseas direct investment with a certain lag. Thus, following the approach of Gregory & Klemp (2016), an instrumental variable for testing is introduced as an explanatory variable for the delayed phase. This instrumental variable helps mitigate the bias introduced by endogeneity.

Furthermore, the results of the weak instrumental variable test indicate that the minimum eigenvalue statistic of 33737.7 exceeds the critical value of the Wald test at a "true significance level" of 10%. Hence, the null hypothesis of "weak instrumental variable" is rejected. The estimation process of the instrumental variables using a two-step regression is presented in the table below. In the first stage, the endogenous explanatory variable, financing structure, is regressed on the instrumental variables, as shown in column (1) of Table 4.6. The instrumental variables exhibit a significant positive impact on the financing structure. In the second stage, the results indicate that the financing structure continues to have a negative impact on enterprises' overseas direct investment. This demonstrates that the endogeneity problem has been addressed and the results remain robust.

Table 4.6 Result of instrumental variable regression

	(1) DEV	(2) OFDI
L. DEV	0.876*** (183.678)	
DEV		-0.062*** (-7.111)
Lnsiz	0.125*** (19.773)	0.373*** (33.287)
Roa	-0.398*** (-3.999)	-0.435*** (-2.804)
Lr	-0.004* (-2.386)	0.001 (0.249)
Lnk	-0.035*** (-5.977)	-0.133*** (-14.138)
Profit	0.007 (0.530)	-0.063*** (-3.342)
TobinQ	0.005 (1.157)	0.026*** (3.421)
Ln	0.038*** (4.011)	0.062*** (4.136)
Constant Term	-2.621*** (-15.022)	-7.842*** (-26.410)
Year fixed effect	Yes	Yes
Regional fixed effect	Yes	Yes
Sample size	17250	17250

Heterogeneity analysis

The heterogeneity of enterprises is examined, and the data samples are classified and analyzed accordingly. Firstly, based on the nature of enterprises, they are divided into state-owned enterprises and non-state-owned enterprises. Regardless of the nature of the enterprise, whether state-owned or non-state-owned, the debt-to-equity ratio exhibits a significant negative correlation with overseas direct investment at a 1% level. This validates the conclusion that a financing structure favoring equity financing increases the likelihood of overseas investment behavior. From the results,

it can be observed that the effect of return on assets on the overseas direct investment of state-owned enterprises is not prominent. However, liquidity has a significant positive impact on the choice of overseas direct investment for state-owned enterprises. In contrast, the impact of liquidity on non-state-owned enterprises' overseas direct investment is relatively weaker. State-owned enterprises themselves possess strong capital strength, resulting in faster capital turnover compared to other private enterprises. The growth ability of state-owned enterprises has a less significant impact on overseas direct investment compared to non-state-owned enterprises. This suggests that non-state-owned enterprises, including small and medium-sized enterprises and innovative enterprises in the growth stage, exhibit stronger growth ability and growth potential compared to state-owned enterprises that have reached a stable stage. As a result, the effect on overseas direct investment is not as pronounced as in non-state-owned enterprises. The internal management ability of non-state-owned enterprises has a negative impact on overseas direct investment, but it is not statistically significant and does not exert a significant influence. This may be attributed to the fact that non-state-owned enterprises, similar to private and foreign-funded enterprises, often have smaller scales, weaker professional expertise, compliance, and relatively lower levels of internal management compared to state-owned enterprises. Alternatively, they may still be in the early stages of growth, and a comprehensive management system has not yet been fully established.

According to the statistical bulletin of FDI in 2020, the top three industries with the largest investment are manufacturing, wholesale and retail, and leasing and business services, with manufacturing enterprises accounting for over 30%. Moreover, in the total sample studied in this paper, manufacturing data exceeds 50%. Consequently, the research samples are further classified into manufacturing and non-manufacturing industries. From Table 4.7, it can be observed that for the manufacturing industry, the influence of financing structure on overseas direct investment is positive but not statistically significant. Presently, commercial banks are consistently enhancing financial services for the manufacturing industry and providing medium- to long-term financing support. As manufacturing is mostly a real industry, it can obtain greater borrowing funds. The limited effect of debt financing on FDI indicates that financing is not the primary issue among the factors influencing FDI of manufacturing enterprises. However, for non-manufacturing enterprises, the conclusion that financing structure negatively affects their overseas direct investment remains valid. The liquidity in the manufacturing industry has a significantly negative impact, whereas the asset liquidity in the non-manufacturing industry exhibits a significant

positive impact at a 1% level. This implies that the asset liquidity of manufacturing industry hinders overseas direct investment, possibly because manufacturing enterprises have longer production cycles and tend to utilize long-term assets for production, resulting in less robust short-term solvency.

Excessive debt inhibits long-term investment. Conversely, stronger asset liquidity in non-manufacturing enterprises promotes overseas direct investment. In the sub-industry analysis, there are positive and negative profitability coefficient estimations, but none of them are statistically significant, indicating that profitability has minimal impact on enterprises' overseas direct investment. However, from the perspective of future growth capacity, manufacturing enterprises exhibit inhibition. The better the development status of manufacturing enterprises, the higher the likelihood of prioritizing domestic production over foreign investment. They choose to apply their superior manufacturing capacity to domestic production rather than promoting overseas investment in the manufacturing industry, which aligns with the expected hypothesis. The regression results for other control variables remain consistent with the baseline regression.

Table 4.7 Result of heterogeneity analysis

	(1) State-owned enterprise	(2) Non state-owned	(3) Manufacture Industry	(4) Non Manufacture Industry
DEV	-0.051*** (-5.760)	-0.050*** (-3.964)	0.015 (0.971)	-0.033*** (-3.954)
Lnsize	0.409*** (28.509)	0.485*** (26.931)	0.450*** (29.711)	0.356*** (23.191)
Roa	-0.435 (-1.526)	-0.540*** (-2.888)	-0.730*** (-3.080)	-0.617*** (-2.576)
Lr	0.019*** (2.559)	-0.005 (-1.609)	-0.008*** (-2.414)	0.014*** (2.780)
Lnk	-0.115*** (-9.011)	-0.098*** (-7.123)	-0.229*** (-12.783)	-0.137*** (-12.165)
Profit	-0.279*** (-5.728)	-0.012 (-0.748)	0.023 (0.380)	-0.012 (-0.905)
TobinQ	0.024* (1.746)	0.030*** (3.396)	-0.023** (-2.057)	0.050*** (5.282)

Table 4.7 Result of heterogeneity analysis (Cont.)

	(1) State-owned enterprise	(2) Non state-owned	(3) Manufacture Industry	(4) Non Manufacture Industry
Ln _{it}	0.085*** (3.991)	-0.009 (-0.413)	0.198*** (8.110)	0.091*** (4.659)
Constant Term	-9.476*** (-23.789)	-9.875*** (-21.989)	-10.033*** (-24.961)	-8.065*** (-19.476)
Year fixed effect	Yes	Yes	Yes	Yes
Regional fixed effect	Yes	Yes	Yes	Yes
Pseudo R ²	0.1759	0.1836	0.2033	0.1838
Sample size	9394	9526	11088	7832

According to the previous literature review, it is evident that financing constraints of enterprises can influence their foreign direct investment behavior. Hence, it is important to investigate whether financing structure is impacted by financing constraints during enterprises' overseas direct investment process, and what differences exist for enterprises with varying degrees of financing constraints. By examining previous literature, it is observed that external financing constraints are frequently utilized to measure corporate financing constraints. These constraints primarily refer to the difficulties faced by corporations in obtaining debt financing from banks or accessing funds through commercial channels. Therefore, this study employs the proportion of corporate interest expenses to fixed assets as a proxy measure of debt financing constraints (FIN). A higher value of this index indicates greater interest payments, suggesting that enterprises can more easily acquire loans and experience weaker financing constraints. The regression results are presented in Table 4.8 below:

Table 4.8 Effect of financing constraints of enterprises on foreign direct investment behavior

	(1) External financing constraints	(2) High external financing constraints	(3) Marginal effect	(4) Low dependence on foreign aid financing	(5) Marginal effect
DEV	-0.049*** (-6.629)	-0.050*** (-5.537)	-0.0164*** (0.00296)	-0.075*** (-6.397)	-0.0243*** (0.00378)
Lnsize	0.372*** (36.002)	0.368*** (24.464)	0.121*** (0.00450)	0.381*** (26.472)	0.123*** (0.00416)
Roa	-0.570*** (-3.840)	-0.092 (-0.449)	-0.0303 (0.0675)	-0.854*** (-3.663)	-0.277*** (0.0755)
Lr	-0.000 (-0.021)	0.003 (0.989)	0.00112 (0.00113)	-0.003 (-0.884)	-0.00108 (0.00122)
Lnk	-0.147*** (-15.714)	-0.082*** (-6.179)	-0.0272*** (0.00437)	-0.171*** (-13.641)	-0.0554*** (0.00395)
Profit	-0.027** (-2.343)	-0.035 (-1.631)	-0.0115 (0.00706)	-0.027* (-1.926)	-0.00889* (0.00461)
TobinQ	0.026*** (3.633)	0.032*** (3.103)	0.0106*** (0.00341)	0.028*** (2.738)	- 0.00897*** (0.00327)
LnM	0.079*** (5.410)	0.059*** (2.896)	0.0194*** (0.00668)	0.060*** (2.955)	0.0196*** (0.00661)
DEV*FIN	-0.005** (-2.102)				
FIN	-0.016*** (-3.793)				
Constant Term	-8.094 (-29.417)	-8.611*** (-21.426)		-7.749*** (-20.300)	
Year fixed effect	Yes	Yes	Yes	Yes	Yes
Regional fixed effect	Yes	Yes	Yes	Yes	Yes
Pseudo R2	0.1600	0.1574	—	0.1674	—
Sample size	18975	9482	9482	9493	9493

The estimated coefficient of financing structure remains significantly negative, indicating that the relationship between financing structure and foreign direct

investment does not change when considering corporate debt financing constraints. Furthermore, the influence of external financing constraints on OFDI is significantly negative, suggesting that as external financing constraints decrease (indicating less stringent constraints), enterprises turn to alternative financing channels such as equity financing, which promotes overseas direct investment. Similarly, the interaction term between financing structure and external financing constraints is significantly negative, indicating that the impact of financing structure on enterprises' overseas direct investment strengthens as external financing constraints decrease. In other words, a higher proportion of equity financing in the financing structure has a more significant impact on enterprises with high debt financing constraints.

An enterprise's reliance on external financing also reflects its financing capacity. Following the approach of Zheng et al. (2023), the ratio of 1-net operating cash flow to capital expenditure was used to measure the external financing dependence of enterprises, with the annual median of this index calculated. If an enterprise's value was higher than the median, it was considered highly dependent on external financing in the current year, and vice versa. The regression results and marginal effects are presented in the table below. As indicated in Table 4.8, regardless of the level of external financing dependence, the financing structure of an enterprise continues to have a significant negative impact on its overseas direct investment. According to the marginal effects, the financing structure has a greater impact on the overseas direct investment of enterprises with low external financing dependence.

Considering regional heterogeneity, the samples are divided into the eastern region and the central and western regions based on where the enterprises are registered. Additionally, the samples are further divided into coastal areas and inland areas. The regression results are presented in Table 4.9

Table 4.9 Result of analysis for perspective of regional heterogeneity

	(1) Eastern region	(2) Central and western regions	(3) Coastal area	(4) Inland region
DEV	-0.038*** (-4.685)	-0.079*** (-6.099)	-0.038*** (-4.417)	-0.103*** (-8.488)
Lnsizes	0.307*** (26.343)	0.418*** (22.318)	0.346*** (25.867)	0.392*** (25.985)

Table 4.9 Result of analysis for perspective of regional heterogeneity (Cont.)

	(1) Eastern region	(2) Central and western regions	(3) Coastal area	(4) Inland region
Roa	-0.239 (-1.419)	-0.925*** (-3.359)	-0.227 (-1.263)	-0.868*** (-3.593)
Lr	-0.000 (-0.166)	0.006 (0.919)	-0.002 (-0.664)	0.014*** (2.818)
Lnk	-0.120*** (-11.868)	-0.187*** (-10.438)	-0.144*** (-13.239)	-0.180*** (-12.154)
Profit	-0.023* (-1.721)	-0.016 (-0.674)	-0.026* (-1.850)	-0.014 (-0.661)
TobinQ	0.024*** (2.998)	0.004 (0.284)	0.032*** (3.831)	0.001 (0.083)
LnM	-0.009 (-0.578)	0.190*** (7.337)	-0.008 (-0.478)	0.226*** (10.209)
Constant Term	-5.721*** (-19.270)	-10.115*** (-20.411)	-6.304*** (-19.101)	-9.868*** (-24.076)
Year fixed effect	Yes	Yes	Yes	Yes
Regional fixed effect	NO	NO	NO	NO
Pseudo R2	0.0947	0.1376	0.1013	0.1417
Sample size	12749	6226	11308	7667

The financing structure of enterprises in both the eastern and central and western regions continues to have a significantly negative impact on their overseas direct investment. Similarly, the financing structure of enterprises in both coastal and inland areas still has a negative impact on their overseas direct investment. In terms of return on assets, it does not have a significant impact on the OFDI of enterprises in the eastern coastal areas. However, in contrast, the return on assets in the inland central and western regions still has a significant negative impact on the OFDI of enterprises. This suggests that when the return on assets is lower, indicating a less favorable development situation for enterprises in China, they are more inclined to expand production overseas. The asset liquidity of enterprises in inland areas has a significantly positive impact on OFDI. This implies that stronger solvency and efficient utilization of funds are conducive to making more overseas direct investments.

Meanwhile, the effect of the growth ability of enterprises in inland areas of the central and western regions is not significant. In general, the majority of Chinese enterprises investing overseas are concentrated in the eastern coastal areas. Furthermore, the negative impact of financing structure on overseas direct investment remains consistent across different regions where the enterprises are located.

Empirical analysis of the influence of financing structure on the transmission mechanism of enterprises' overseas direct investment

1. Innovation input transmission mechanism

To verify the influence mechanism and effect of corporate financing structure on FDI behavior through innovation and R&D intensity, a mediation-effect model is established based on the research ideas of Wen et al. (2004). The significance test is conducted on α_1 in model (4.3) and α_2 in model (4.4). If both α_1 in model (4.3) and α_2 in model (4.4) pass the significance test, it indicates the presence of a significant mediation effect. The specific model is as follows:

$$OFDI_{it} = a_0 + a_1 DEV_{it} + \sum_{i=2}^n a_n control_{it} + \epsilon_{it} \quad (4.2)$$

$$RD_{it} = a_0 + a_1 + DEV_{it} + \sum_{i=2}^n a_n control_{it} + \epsilon_{it} \quad (4.3)$$

$$OFDI_{it} = a_0 + a_1 + DEV_{it} + a_2 RD_{it} + \sum_{i=3}^n a_n control_{it} + \epsilon_{it} \quad (4.4)$$

To test the intermediary effect of RD enterprise innovation R&D input, the intensity of enterprise innovation input is selected as a measure of enterprise innovation R&D. It is calculated as the ratio of R&D expenditure to total revenue, based on existing relevant literature. With reference to the theoretical hypothesis 2 proposed in this paper and the established models (4.2) - (4.4), the relationship between overseas direct investment, innovation research and development, and corporate financing structure is examined. The regression results are presented in Table 4.10.

Table 4.10 The intermediary effect on the relationship between overseas direct investment, innovation research & development and corporate financing structure.

	(1) OFDI	(2) RD	(3) OFDI
DEV	-0.057*** (-8.120)	-0.001*** (-2.621)	-0.046*** (-6.497)
Lnsiz	0.369*** (35.889)	0.001 (1.500)	0.382*** (36.730)
Roa	-0.504*** (-3.428)	-0.026*** (-5.788)	-0.445*** (-2.998)
Lr	0.000 (0.050)	0.000*** (5.535)	-0.006** (-2.110)
Lnk	-0.130*** (-14.408)	-0.001 (-1.285)	-0.115*** (-12.573)
Profit	-0.028** (-2.381)	-0.001*** (-2.674)	-0.023* (-1.830)
TobinQ	0.027*** (3.825)	0.001** (2.079)	0.017** (2.280)
Ln	0.060*** (4.188)	0.001 (1.615)	0.041*** (2.836)
RD			3.695*** (16.853)
Constant Term	-8.025*** (-29.280)	-0.012 (-0.727)	-8.371*** (-30.214)
Year fixed effect	Yes	Yes	Yes
Regional fixed effect	Yes	Yes	Yes
Pseudo R2/R2	0.1580	0.1107	0.1694
Sample size	18975	18975	18975

The results in column 1 correspond to model (4.2), which examines the influence of the debt-equity ratio of the enterprise financing structure on whether enterprises make overseas direct investment. The regression coefficient is significantly negative at the 1% level, consistent with the previous results, indicating that the corporate financing structure, favoring equity financing, promotes enterprises to make overseas direct investment. The results in column 2 correspond to model (4.3), which

investigates the impact of corporate financing structure on corporate innovation R&D input. The regression coefficient is significantly negative at the 1% level, suggesting that the corporate financing structure has a negative impact on corporate innovation R&D input. This implies that a greater emphasis on equity financing in the financing structure promotes corporate innovation R&D. The results in column 3 correspond to model (4.4), which examines the regression results of independent variables and intermediary variables with the dependent variable after the addition of innovation research and development.

The results indicate that enterprise innovation research and development has a significantly positive effect at the 1% level, suggesting that enterprise innovation promotes overseas direct investment. The debt-equity ratio of the financing structure is significantly negative at the 1% level, and the regression coefficient is numerically smaller compared to when no intermediary variable is added. Each coefficient in the regression result aligns with the expected intermediary effect, indicating that innovation research and development plays a mediating role between corporate financing structure and FDI. This further suggests that a smaller debt-equity ratio in the corporate financing structure, favoring equity financing, promotes enterprise innovation and research and development, leading to increased overseas direct investment. In summary, hypothesis 2 is verified.

2. Productivity transmission mechanism

Similar to the mediation effect of innovation input, we should also conduct a mediating effect test to examine the impact of productivity on financing structure and enterprises' overseas direct investment. The same three-step method is adopted, regressing the dependent variable on the independent variable, regressing the intermediary variable on the independent variable, and finally regressing the dependent variable on both the independent variable and the intermediary variable. Referring to models (4.2) to (4.4), we construct models (4.5) to (4.7) to examine the mediating effects of productivity.

$$OFDI_{it} = a_0 + a_1DEV_{it} + \sum_{i=2}^n a_n control_{it} + \varepsilon_{it} \quad (4.5)$$

$$TFP_{it} = a_0 + a_1DEV_{it} + \sum_{i=2}^n a_n control_{it} + \varepsilon_{it} \quad (4.6)$$

$$OFDI_{it} = a_0 + a_1DEV_{it} + a_2TFP_{it} + \sum_{i=3}^n a_n control_{it} + \varepsilon_{it} \quad (4.7)$$

In these models, TFP represents the productivity of enterprises. In this study, the LP method, as mentioned by Lu & Lian (2012, pp.541-558), is used to

measure the productivity of enterprises using Stata. Since industrial added value is not available in the financial data center published by the listed company, we use the annual main business income of the enterprise as a proxy. Labor input is represented by the number of employees, capital input is represented by the original value of the enterprise's fixed assets, projects under construction, and construction materials, and the intermediate input variable is represented by the cash paid by the enterprise for goods purchased and services received. Furthermore, all the aforementioned variables are in logarithmic form. The regression results are presented in Table 4.11.

Table 4.11 The mediating effect of productivity on financing structure and enterprises' overseas direct investment.

	(1) OFDI	(2) TFP	(3) OFDI
DEV	-0.057*** (-8.120)	-0.007** (-2.009)	-0.057*** (-8.191)
Lnsiz	0.369*** (35.889)	0.651*** (82.579)	0.317*** (21.997)
Ro	-0.504*** (-3.428)	0.641*** (12.316)	-0.582*** (-3.915)
Lr	0.000 (0.050)	-0.009*** (-8.850)	0.002 (0.687)
Lnk	-0.130*** (-14.408)	-0.155*** (-26.186)	-0.110*** (-11.152)
Profit	-0.028** (-2.381)	0.061*** (14.807)	-0.032*** (-2.667)
TobinQ	0.027*** (3.825)	0.019*** (6.360)	0.029*** (4.025)
Ln	0.060*** (4.188)	0.219*** (25.637)	0.042*** (2.820)
TFP			0.082*** (5.189)
Constant Term	-8.025*** (-29.280)	-0.459** (-2.420)	-8.108*** (-29.525)
Year fixed effect	Yes	Yes	Yes
Regional fixed effect	Yes	Yes	Yes

Table 4.11 The mediating effect of productivity on financing structure and enterprises' overseas direct investment. (Cont.)

	(1) OFDI	(2) TFP	(3) OFDI
Pseudo R2/R2	0.1580	0.6722	0.1590
Sample size	18975	18975	18975

Column (1) in the table corresponds to model (4.5), which serves as the benchmark regression model in this study. The regression results indicate a significantly negative impact of financing structure on overseas direct investment of enterprises at the 1% level. Column (2) corresponds to model (4.6), which examines the relationship between enterprise productivity and financing structure. The results reveal a significantly negative impact of financing structure on enterprise productivity at the 5% level, suggesting that a higher proportion of equity financing in the enterprise's financing structure contributes to improved productivity. Column (3) presents the regression results of model (4.7). After including enterprise productivity and financing structure as independent variables, the findings demonstrate that the impact of financing structure on overseas direct investment remains unchanged, while the effect of enterprise productivity on FDI is significantly positive at the 1% level. This indicates that enterprise productivity plays a promotive role in driving overseas direct investment. In conclusion, each coefficient in the regression results aligns with the coefficient results hypothesized in the mediation effect model, indicating that financing structure indeed influences enterprises' overseas direct investment. The change in financing structure affects changes in enterprise productivity, and productivity, in turn, impacts overseas direct investment. Specifically, a financing structure favoring equity financing promotes increased enterprise productivity, which, in turn, fosters greater overseas investment by enterprises. Hence, hypothesis 3 is verified.