Enterprise Internationalization, Trademark Internationalization and Enterprise Value

---Based on Empirical Evidence of Listed Companies in Western China

Xuan Zhang[1], Jia Yang[1] & Xuan Wang[1]

[1] Business School, Northwest Normal University, Lanzhou 730070, Gansu, China

Correspondence: Xuan Zhang, Business School, Northwest Normal University, Lanzhou 730070, Gansu, China. E-mail: 2249845335@qq.com

Abstract

Trademark internationalization is an important part of enterprise internationalization, and the degree of enterprise internationalization will inevitably affect the level of trademark internationalization. The practice shows that the degree of enterprise internationalization has different effects on the level of trademark internationalization and enterprise value. This article takes the Shanghai and Shenzhen A-share listed enterprises in western China from 2010 to 2019 as the research object, discusses and empirically tests the impact of trademark internationalization on enterprise value, and analyzes the moderating effect of the degree of enterprise internationalization on the relationship between the two. The study found that the level of trademark internationalization has a positive impact on enterprise value, but the degree of enterprise internationalization will have a negative impact on the relationship between the level of trademark internationalization and enterprise value. Compared with non-high-tech enterprises, the degree of internationalization of high-tech enterprises has a more significant negative regulatory effect on the level of trademark internationalization and enterprise value.

Keywords: trademark internationalization, enterprise internationalization, enterprise value

1. Introduction

International competitiveness is an important support for enterprises to carry out transnational operation in the process of economic globalization and integration. Due to the distinctive, exclusive and regional characteristics of trademarks, the cross-regional flow of trademarks provides more ways for enterprises to obtain competitive advantages and create value. At present, many enterprises are facing difficulties in financing, transformation and opening up, especially in western China. However, the trademark resources, characteristic industry advantages and policy advantages of western enterprises can provide more chances for the internationalization of trademarks and the transformation of development momentum, so it is significant to pay attention to the internationalization of trademarks for the development of western enterprises. Currently, more and more scholars in China begin to pay attention to the practical issue of cross-regional flow of trademarks, but most of them remain in the theoretical research stage like research review (Zhonghe Han, 2008) and internal and external factors that influence the internationalization of trademarks (Yi Wu and Jiaxun He, 2017; Zhaohui Wang et al., 2013), few scholars have empirically verified how much value trademark internationalization has created for enterprises, especially western enterprises. Based on the above, this paper uses empirical research method to explore the impact of trademark internationalization on enterprise value in western China.

In addition, the development level of trademark internationalization particularly depends on the degree of

enterprise's involvement in the international market. On the one hand, the enterprise internationalization provides necessary resources and learning opportunities for trademark internationalization, which can guarantee and promote the creation of trademark value. On the other hand, due to the outsider disadvantage and the increased risk of knowledge and technology leakage, enterprise internationalization may have a negative impact on the creation of trademark value. At present, most scholars focus on the impact of enterprise internationalization on patent output (Xin Xu and Yun Xia, 2017; Bin Dai et al., 2016), few scholars have studied the impact of enterprise internationalization degree on trademark internationalization and enterprise value. In fact, relevant statistics show that the total foreign trade of the western China accounts for a small share of the total foreign trade of the country, but the overall trend is upward (Note 1), indicating that the internationalization degree of western enterprises is still deepening, which will have an impact on the strategic development of enterprises. Therefore, in order to better realize the function of trademarks in the process of enterprises development in western China, it has become an important issue to clearly understand the impact of enterprise internationalization on the relationship between trademark internationalization and enterprise value, which should be paid attention to in the process of sustainable development of enterprises in western China.

To sum up, this paper selects the data of Shanghai and Shenzhen A-share listed enterprises in western China from 2010 to 2019 as a research sample to discuss the following two questions: First, can the trademark internationalization promote the enhancement of enterprise value for western enterprises? Second, if the trademark internationalization can enhance the value of enterprises, is the degree of international market involvement of western enterprises incentives or restraints for this effect?

2. Theoretical Basis and Research Hypothesis

2.1 Analysis of the Impact of Trademark Internationalization on Enterprise Value

According to the enterprise resource theory, the unique assets and capabilities of an enterprise that are different from other enterprises are the important factors that affect the enterprise to obtain the favor of stakeholders and excess returns (Barney, 1991). The enterprise's control of special resources can form different barriers compared with other related enterprises. Regarding the research on the trademark and the enterprise value, most scholars believe that trademark can promote the improvement of the financial value of the enterprise by establishing the relationship between brand awareness and consumers (Alexander et al. 2009), protecting and creating corporate advantages (Mehrazeen et al. 2012; Ukiwe and Alladin, 2009), attracting investors to re-evaluate (Block and Sandner, 2011) and other ways. With the intensification of enterprise market competition, the role of trademarks become more prominent, and the advantages of enterprise trademarks in international market competition have also been paid more and more attention. Trademark internationalization (Note 2) refers to the process by which a company's trademark is certified and recognized internationally, and is used reasonably to create value. This paper believes that trademark internationalization has a certain impact on enterprise value.

Western enterprises already have a certain trademark foundation through the implementation of the trademark strategy, and their motivation to go abroad to obtain more market shares on the basis of gradually stabilizing domestic development is becoming stronger and stronger. Therefore, it is one of the new directions for western enterprises to transform their growth path by building international trademark assets in the process of enterprise internationalization development. This paper believes that trademark internationalization mainly affects the value of western enterprises from the following aspects: First, trademark internationalization can alleviate the problem of information asymmetry in the international market. It is specifically embodied in helping consumers to reduce search costs and improve the credibility of the quality of goods and services, as well as helping investors to identify the investment value of the company, which can alleviate the financing constraints of the company. Second, trademarks have the additional function of creating a "deterrent" effect in the market. If some negative incidents are involved in the process of trademark internationalization, such as product recalls, deceptive advertisements and fraud, the scale of losses it bears may be far greater than the actual value on the surface (Ramello, 2006). Therefore, trademark internationalization will urge enterprises to strictly supervise their own business activities. Third, trademarks have externalities. The behavior of trademark squatting abroad makes the economic benefits of enterprises engaged in trademark activities more easy to be stolen and used by competitors, and it will cost a lot of money and time to carry out foreign rights protection. Therefore, trademark internationalization will reduce the probability of trademark value overflow. Fourth, trademarks have the characteristic of exclusivity, and companies can obtain extra benefits through trademark licensing or trademark transfer in foreign countries. Meanwhile, trademark internationalization is a gradual development process, mainly including design internationalization, international registration, and international publicity, which requires enterprises to invest time, human and material assets in planning and implementation. However, capital shortage and external financing obstacles exist in western enterprises. If enterprises make trademark

internationalization investments too early or too large, it may be difficult to absorb the large amount of sunk costs in a short period of time, which will make the company's long-term strategy lack room for adjustment and increase enterprises risks, at this time, it will have a negative impact on enterprise value.

In summary, this paper proposes competitive research hypotheses:

H1a: The level of trademark internationalization will enhance enterprise value.

H1b: The level of trademark internationalization will reduce enterprise value.

2.2 Analysis of the Moderating Effect of Enterprise Internationalization on Trademark Internationalization and Enterprise Value

Enterprise Internationalization refers to a process in which companies actively participate in the international division of labor and continuously increase their involvement in the international market. The increase in the degree of internationalization means that companies are more closely connected with foreign markets. On the one hand, this article believes that the degree of enterprise internationalization promotes the internationalization of western enterprise trademarks in terms of competition threats, information acquisition, and resource utilization, thereby realizing enterprise value-added. Specifically, first, the deepening of enterprise internationalization is a process of constantly breaking organizational boundaries, which will increase the risk of internal knowledge and technology leaks (Sanna-Randaccio and Veugelers, 2007), and further force enterprises to deploy trademark internationalization. Meanwhile, the increase in the level of trademark internationalization will help enterprises avoid opportunistic behavior in the open environment, reduce intellectual property disputes in the process of enterprise internationalization, and ensure the fairness and sustainability of competition through the realization of positive externalities ,which can encourage enterprises continuously create value. Second, the increase in the degree of enterprise internationalization is conducive for enterprises to search for information and knowledge of the target market in depth, and establish in-depth communication and information acquisition channels (Gongwei Wang and Jisheng Peng, 2016). Enterprises understand the different needs of local consumers and carry out effective cross-cultural management of trademarks to reduce the risk of conflicts in multinational operation, and then better use trademark assets in the new environment to create value for enterprises. Third, the deepening of enterprise internationalization facilitates enterprises to carry out in-depth division of labor and resource integration, which provides corresponding experience and resources for the creation of trademark core values. By continuously using the knowledge and technology accumulated by enterprises in the market, enterprises can focus on the core, distinctive and competitive value links to develop the comparative advantages of trademarks, and realize the growth of trademarks and the enhancement of enterprise value.

However, on the other hand, due to the lack of resource reserves and internationalization experience of western enterprises, the degree of enterprise internationalization may bring adverse effects or greater challenges to western enterprises' trademark internationalization and self-value shaping. First of all, if the degree of enterprise internationalization is low, enterprises may not be able to support excessive or premature cost input for trademark internationalization, which leads to misallocation of resources and cost precipitation in the company. The increase of enterprise risk and uncertainty has negative influence on enterprise value. Secondly, some enterprises register trademarks for the purpose of defense or hoarding (Yangao Xiao et al., 2021). The deepening of enterprise internationalization does not promote enterprises to further use and management of trademarks, thus the investment value of trademark assets is weakened.

Based on the above analysis, this article puts forward the competitive hypothesis:

H2a: The degree of enterprise internationalization positively moderates the relationship between trademark internationalization level and enterprise value.

H2b: The degree of enterprise internationalization negatively moderates the relationship between trademark internationalization level and enterprise value.

2.3 The Moderating Role of Enterprise Internationalization: Technical Characteristics of Different Enterprises

Enterprises with different technical characteristics have different motives for entering the international market. Compared with non-high-tech enterprises, the more important motivation for the internationalization of high-tech enterprises is to acquire advanced foreign knowledge, technology and human resources. The higher the degree of internationalization of high-tech enterprises are, the stronger the ability to absorb and use local knowledge, technology, and experience to carry out product innovation they have. The achievements of product innovation are concentrated in the development and value enhancement of the company's trademark , and the reputation and competitiveness of the enterprise will be continuously accumulated, which deliver positive signals of value enhancement to investors and enable enterprises to obtain more financial support.

In addition, compared with non-high-tech enterprises, high-tech enterprises have the characteristics of long R&D cycle, slow input and output, fast product iteration and update, and fierce market competition. With the global flow of production factors and the further deepening of market competition, the products of high-tech enterprises are gradually standardized, and the technology and quality are improved slowly (Minghui Dai et al., 2008). If high-tech enterprises want to maintain long-term market competitive advantage and growth capability in the international market, the establishment and cultivation of trademark is a feasible way. A strong trademark can provide high-tech enterprises with capital buffer for R&D and promotion of new products, increase consumer stickiness to establish a continuous and stable marketing network, and expand the space for enterprises to create value. Based on the above analysis, this article further groups and proposes hypothesis:

H3: Compared with non-high-tech enterprises, the degree of internationalization of high-tech enterprises plays a stronger role in positively moderating the relationship between Trademark Internationalization Level and enterprise value.

3. Research Design

3.1 Sample Selection and Data Sources

This paper takes listed companies in Shanghai and Shenzhen A-share markets in western China from 2010 to 2019 as the research object, screening and processing the samples according to the following criteria: (1) Exclude listed enterprises with ST and *ST marks; (2) Exclude enterprises listed after 2010; (3) Exclude enterprises that have not provided trademark registration data to the Global Brand Database; (4) Exclude samples with missing data during the ten-year period from 2010 to 2019; (5) Exclude financial and insurance enterprises; (6) In order to eliminate the influence of extreme values, all continuous variables are reduced by 1% up and down in this article. The trademark internationalization data comes from the Global Brand Database in the World Intellectual Property Organization (Note 3). The specific collection process is as follows: (1) Collect and verify trademark data. Enter the English name of the listed enterprise in the Names column of the Global Brand Database's search basis to download the enterprise annual registered trademark name. This process is carried out by two persons at the same time and check the information with each other; (2) Screen the status of trademarks and count the stock of trademarks. Classify trademarks according to the year and keep the trademarks with the status of successful registration (Active),and the annual stock of international trademarks is counted as the basis of index calculation at the same time (Yangao Xiao et al., 2021). The data of the degree of enterprise internationalization comes from the Wind database, and enterprise value and other financial data come from the CSMAR database. In the end, 570 qualified samples were selected.

3.2 Variable Selection and Definition

3.2.1 Explained Variable

Enterprise value. At present, scholars at home and abroad already have many kinds of measurement indicators for enterprise value. This article selects Tobin's Q (TQ) which commonly be accepted and used by scholars to measure enterprise value. The calculation formula of this indicator is TQ=(equity market value + net debt market value)/Total assets at the end of the period, where the market value of non-tradable equity in the equity market value is replaced by net assets; the market value of net debt = total liabilities-employee compensation payable-dividend payable-taxes payable-other payables-deferred income tax liabilities.

3.2.2 Explanatory Variable

Trademark internationalization. International trademark registration is the basic way for enterprises to implement trademark internationalized business strategies. Therefore, according to Xiaoqing Feng (2008) and Greenhalgh and Gogers (2012), the intensity of trademark internationalization (ITI) is used as an indicator to measure the level of trademark internationalization ,that is, the number of international registered trademarks included in the Global Brand Database per 100 million yuan of assets.

3.2.3 Moderator

Enterprise internationalization. For the measurement of enterprise internationalization, many scholars at home and abroad do not have an established measurement method for this. Based on previous studies, scholar Limin Chen(2014) concluded that there are three main indicators for measuring the degree of enterprise internationalization: the depth of internationalization index, the breadth of internationalization index and the composite index of internationalization. The Foreign Sales to Total Sales (FSTS) in the internationalization depth indicator refers to the proportion of overseas sales revenue to total sales revenue, focusing on measuring the company's dependence on overseas markets. Comprehensively considering the content of this article and the availability of data, this article chooses FSTS as the indicator to measure the degree of enterprise

internationalization. In order to eliminate the influence of heteroscedasticity, this paper takes the logarithm of FSTS as the research object.

3.2.4 Control Variables

In the multiple regression model, learning from the practices of predecessors (Chaopeng Wu and Di Tang, 2016; Nicholas and John, 2002; Mehrazeen et al., 2012), we add other control variables that may affect trademark Internationalization and enterprise value. Specifically include: (1) Enterprise size (Size). The larger the enterprise size, the more resources the enterprise has accumulated, and the stronger the ability to create enterprise value and carry out international development; (2) Debt equity ratio (LEV), which controls the influence of capital structure on enterprise strategic development direction; (3) Operating income growth rate (Selerate), the faster the operating income growth, the greater the value created for the enterprise; (4) The proportion of intangible assets (Inta), in addition to trademark assets, enterprise's patent rights, non-patent technology, copyright, land use rights and other intangible assets will also have a certain impact on the enhancement of enterprise value; (5) The proportion of fixed assets (Fata), fixed assets create value for enterprises in their production and operation activities; (6) The proportion of sales expenses (Sesa), the increase in the marketing cost of goods and services will affect the reputation of the trademark, thereby creating enterprise value;(7) The enterprise 's establishment period (Firmage), the longer the enterprise establishment period which reflects the enterprise's reputation for credit and the accumulation of various resources, the greater the trademark value and enterprise value at this time; (8) The largest shareholder's shareholding ratio (Fsrate) , which controls the impact of enterprise governance on enterprise value; (9) Enterprise technical characteristics. Finally, in order to control the influence of province factors, industry factors and annual factors, province dummy variables, industry dummy variables and annual dummy variables are added to the model.

The definition and measurement of the main variables in this paper are shown in Table 1:

Table 1. Main variable definition table

Variable type	Variable code	Variable name	Variable measurement method
Explained variable	TQ	Enterprise value	(Equity market value + net debt market value) / total assets at the end of the period
Explanatory variable	ITI	Trademark internationalization	Number of internationally registered trademarks/ (total assets / 100 million)
Moderator	FSTS	Enterprise internationalization	Overseas sales revenue/total sales revenue
Control variables	Size	Enterprise size	Natural logarithm of total assets
	Selerate	Operating income growth rate	Current operating income growth value/Last period operating income
	LEV	Debt equity ratio	Period-end liabilities/period-end owners' equity
	Inta	Proportion of intangible assets	Intangible assets at the end of the period/total assets at the end of the period
	Fata	Proportion of fixed assets	Fixed assets at the end of the period/Total assets at the end of the period
	Sesa	Proportion of sales expenses	Current sales expenses/current operating income
	Firmage	Years of establishment of the enterprise	The natural logarithm of the company's years of establishment
	Fsrate	The largest shareholder's	The largest shareholder's shareholding/total share capital

	shareholding ratio	
Htfirm	Enterprise technical characteristics	Set to 1 for high-tech enterprises and 0 for non-high-tech enterprises
pro	Province	Province dummy variable
Ind	Industry	Industry dummy variables
Year	Year	Annual dummy variable

3.3 Variable Selection and Definition

In order to test hypothesis 1a and 1b, this paper established the following model:

$$TQ_{it}=\beta_0+\beta_1 ITI_{it}+\beta_2 Size_{it}+\beta_3 Selerate_{it}+\beta_4 LEV_{it}+\beta_5 Inta_{it}+\beta_6 Fata_{it}+\beta_7 Sesa_{it}+\beta_8 Firmage_{it}+\beta_9 Fsrate_{it}+pro+Ind+Year+\varepsilon_{i,t} \tag{1}$$

In order to test hypotheses 2a and 2b, this paper established the following model:

$$TQ_{it}=\beta_0+\beta_1 ITI_{it}+\beta_2 ITI_{it}\times lnFSTS_{it}+\beta_3 lnFSTS_{it}+\beta_4 Size_{it}+\beta_5 Selerate_{it}+\beta_6 LEV_{it}+\beta_7 Inta_{it}+\beta_8 Fata_{it}$$
$$+\beta_9 Sesa_{it}+\beta_{10} Fsrate_{it}+\beta_{11} Firmage_{it}+pro+Ind+Year+\varepsilon_{i,t} \tag{2}$$

In model (2), $ITI_{it}\times lnFSTS_{it}$ indicates that the degree of enterprise internationalization has a regulatory effect on the level of trademark internationalization and enterprise value. If β2 is significantly greater than zero, the degree of enterprise internationalization positively moderates the relationship between trademark internationalization level and enterprise value, and hypothesis 2a establishes; if β_2 is significantly less than zero, the degree of enterprise internationalization negatively moderates the relationship between the level of trademark internationalization and enterprise value, and hypothesis 2b establishes.

4. Empirical Results and Analysis

4.1 Descriptive Statistical Analysis

4.1.1 Descriptive Statistical Analysis of Total Sample

This paper collects relevant information about listed enterprises in the western China in the Global Brand Database from 2010 to 2019. A total of 57 listed companies meet the sample selection conditions. Table 2 provides a statistical analysis of the data characteristics of the variables. From the results in Table 2, we can get the average value of international trademark registration intensity (ITI) of listed companies in western China is 0.204, the minimum values is 0, the maximum value is 1.620, and the standard deviation is 0.317. The gap is quite large, which shows that the degree of emphasis on international trademark registration and the measures taken by different listed companies in the western region are quite different .The average value of the enterprise value (TQ) is 2.267, and the standard deviation is 1.395, indicating that there is a slight gap in the degree of development of listed companies in the western region. In addition, the descriptive statistics showed that there are 431 samples had overseas sales revenue out of the 570 samples of international trademark registration, the remaining companies did not. The two reasons for this situation are as follows: First, the sales scope of the company is mainly in domestic, so the company did not disclose its overseas sales; second, because the company is located in the western region, so the overall growth rate of the company is relatively slower compared to the non-western region, and it has not yet carry out deeply international strategic deployment. From the 431 sample data with overseas sales income, it is observed that the logarithm mean of the degree of internationalization (FSTS) is 1.769, and the standard deviation is 1.629, indicating that the degree of internationalization of listed companies in the western region shows a certain degree of difference in total.

Table 2. Descriptive statistics of variables

Variable	N	mean	sd	min	median	max
TQ	570	2.267	1.395	0.850	1.735	7.733
ITI	570	0.204	0.317	0.000	0.079	1.620
lnFSTS	431	1.769	1.629	-3.507	2.232	4.083
Fata	570	0.245	0.146	0.046	0.211	0.660
Inta	570	0.046	0.032	0.001	0.041	0.178

LEV	570	1.258	1.319	0.081	0.866	8.857
Size	570	22.735	1.313	20.216	22.520	25.392
Selerate	570	0.149	0.364	-0.413	0.100	2.601
Fsrate	570	35.934	16.677	7.260	35.325	74.980
Sesa	570	0.107	0.111	0.005	0.067	0.532
Firmage	570	2.796	0.349	1.386	2.833	3.401
Htfirm	570	0.684	0.465	0	1	1

4.1.2 Descriptive Statistical Analysis of Grouped Samples

The 57 western listed companies are divided into the high-tech enterprise group and the non-high-tech enterprise group according to the technological characteristics of enterprises (Htfirm). It can be seen from Table 3 that there are 39 high-tech enterprises in the sample of this paper, accounting for 32%. The average enterprise value and the average trademark internationalization level are 2.347 and 0.222 respectively, which are both higher than the overall average, while the average of the degree of internationalization is 1.705, which is lower than the overall average. There are 18 non-high-tech enterprises, accounting for 68%, and the average enterprise value and average trademark internationalization level are 2.092 and 0.165 respectively, which are both lower than the overall average, and the average of the degree of internationalization is 1.966, which is higher than the overall average. From the grouping descriptive statistics, it can be seen that the degree of internationalization of non-high-tech enterprises in western China is higher than that of high-tech enterprises.

Table 3. Descriptive statistics of high-tech group and non-high-tech group

group	quantity	Percentage	Average enterprise value	Average trademark internationalization level	Average degree of internationalization
High-tech group	39	32%	2.347	0.222	1.705
Non-high-tech group	18	68%	2.092	0.165	1.966
total	57	100%	2.267	0.204	1.769

4.2 Empirical Analysis

4.2.1 Correlation Analysis

Table 4 is the Pearson correlation analysis results of model (1) and model (2) involving the main variables. From Table 4, we can see that the correlation coefficient between the main variables trademark international registration intensity (ITI) and enterprise value (TQ) is 0.188, which is significant at the 1% level, preliminarily indicating that the level of trademark internationalization can increase enterprise value. The correlation coefficient between TQ and the logarithm of enterprise internationalization (lnFSTS) is -0.360, which is significant at the 1% level; the correlation coefficient between ITI and lnFSTS is 0.147, which is significant at the 1% level. The adjustment direction of the degree of enterprise internationalization on the relationship between trademark internationalization and enterprise value is not yet clear, so further regression analysis is needed. In addition, the VIF of each variable is less than 10, indicating that there is no serious multicollinearity among the variables.

4.2.2 Trademark Internationalization and Enterprise Value

In order to test the relationship between trademark internationalization (ITI) and enterprise value (TQ), this paper conducts multiple regression analysis on model (1). Column (1) of Table 5 lists the regression results of the model. The regression coefficient of ITI in model (1) is 0.678, and it is significant at the 1% level, indicating that after a listed company in the western region has registered trademarks abroad, it will obtain better resources and reputation than before without registered international trademarks, thereby promoting the increase of enterprise value compared to before. Therefore, the level of trademark internationalization has a positive impact on enterprise value, and H1a has been confirmed.

Table 4. Correlation coefficient analysis of variables

	TQ	ITI	lnFSTS	Fata	Inta	LEV	Size	Selerate	Fsrate	Sesa	Firmage	Htfirm
TQ	1											
ITI	0.188***	1										
lnFSTS	-0.360***	0.147***	1									
Fata	-0.246***	-0.114***	0.227***	1								
Inta	-0.030	0.006	0.160***	0.063	1							
LEV	-0.301***	-0.293***	0.184***	0.223***	-0.118***	1						
Size	-0.390***	-0.403***	0.130***	0.091**	-0.083**	0.449***	1					
Selerate	0.076*	-0.039	0.024	-0.019	0.071*	0.047	-0.019	1				
Fsrate	0.018	-0.086**	-0.016	-0.088**	0.040	0.114***	0.086**	0.034	1			
Sesa	0.352***	0.079*	-0.355***	-0.112***	-0.056	-0.241***	-0.202***	-0.072*	-0.155***	1		
Firmage	-0.148***	-0.058	0.011	0.098**	-0.043	0.119***	0.211***	-0.090**	-0.368***	0.084**	1	
Htfirm	0.085**	0.083**	-0.069	-0.381***	0.056	-0.068	-0.038	0.022	0.100**	0.015	-0.164***	1

Note: ***, **, * indicate the significance level of 0.01, 0.05, and 0.1 respectively. The correlation coefficient r is between -1-1, it can be regarded as high correlation when |r|≥0.8; it can be regarded as moderate correlation when 0.5≤|r|<0.8; it is regarded as low correlation when 0.3≤|r When |<0.5; it indicates that the correlation between the two variables is extremely weak when |r|<0.3.

4.2.3 Enterprise Internationalization, Trademark Internationalization and Enterprise Value

In order to test whether trademark internationalization has an impact on enterprise value under the influence of the degree of enterprise internationalization, this paper introduces the crossover term (lnFSTS×ITI) of the degree of enterprise internationalization and trademark international registration intensity, and performs multiple regression analysis on model (2), showing the results in column (2) of Table 5. From the data in Table 5, the lnFSTS×ITI coefficient is -0.261, which is significant at the 5% level, indicating that the degree of enterprise internationalization negatively regulates the relationship between the trademark internationalization level and enterprise value. H2b is supported. The traditional conclusion on internationalization strategy is that the degree of enterprise internationalization will positively affect the behavior or outcome variables of the company. The conclusion of this paper is inconsistent with the traditional research conclusion. The analysis of this result is: western enterprises have a low degree of internationalization and may not be able to support excessive or premature investment in trademark internationalization, leading to increased risks and uncertainties. In addition, some western enterprises registered trademarks in the international market only to protect intellectual property rights, and did not further use and manage the trademarks, resulting in inefficient use of trademarks.

Table 5. Empirical results

	TQ			
variable	(1)		(2)	
	coefficient	T value	coefficient	T value
ITI	0.678***	3.03	1.311***	3.97
lnFSTS			-0.028	-0.43

lnFSTS×ITI			-0.261**	-2.19
Fata	-1.650***	-2.82	-2.157**	-2.66
Inta	-7.600***	-2.94	-2.891	-1.11
LEV	-0.022	-0.48	-0.044	-1.02
Size	-0.293***	-3.82	-0.311***	-3.21
Selerate	0.226*	1.84	0.069	0.55
Fsrate	0.010*	1.88	0.008	1.55
Sesa	2.048*	1.72	1.503	0.63
Firmage	-0.127	-0.41	-0.238	-0.86
Htfirm	-0.103	-0.50	0.033	0.15
cons	11.045***	5.26	11.491***	4.08
Ind	Control		Control	
Year	Control		Control	
pro	Control		Control	
Adj R^2	0.619		0.709	
N	570		431	

Note: ***, **, * indicate the significance level of 0.01, 0.05, 0.1 respectively, the standard error is adjusted by the company-level cluster, and the t value is in the parentheses.

4.3 Further Group Regression

In order to further test the role of the degree of enterprise internationalization in regulating the relationship between trademark internationalization and enterprise value, this paper divides listed enterprises in the western region into high-tech enterprises (Htfirm=1) and non-high-tech enterprises (Htfirm=0) according to their technical characteristics. Table 6 is the specific regression results. It can be seen from the table that the coefficient of the crossover term (lnFSTS×ITI) between the trademark internationalization and the degree of enterprise internationalization of non-high-tech enterprises is not significant, but the coefficient of the crossover term (lnFSTS×ITI) in high-tech enterprises is -0.336, which is significant at the 1% level, indicating that the degree of enterprise internationalization in high-tech companies still negatively regulates the relationship between trademark internationalization and enterprise value. H3 does not hold. The reason is that the western high-tech enterprises have a relatively low degree of internationalization, which caused the input cost of the trademark to be greater than the benefits of the current trademark; or western high-tech enterprises have not deeply explored the value of international trademarks.

Table 6. The moderating effect of the degree of internationalization of enterprises under different technical characteristics

variable	Htfirm=0		Htfirm=1	
	coefficient	T value	coefficient	T value
ITI	-4.537	-1.60	1.353***	3.79
lnFSTS	-0.354*	-1.89	0.004	0.07
lnFSTS×ITI	1.659	1.68	-0.336***	-2.97
Fata	-0.455	-0.62	-2.177**	-2.50
Inta	-3.421**	-2.67	-2.128	-0.55
LEV	-0.066	-0.49	-0.046	-0.99
Size	-0.275	-1.77	-0.450***	-3.96
Selerate	0.277	1.54	-0.024	-0.14

Fsrate	0.016	1.52	0.014**	2.54
Sesa	-0.732	-0.29	1.461	0.58
Firmage	-6.060	-1.05	-0.697**	-2.15
cons	23.955	1.57	15.794***	4.74
Ind		Control		Control
Year		Control		Control
pro		Control		Control
Adj R^2		0.822		0.718
N		106		325

Note: ***, **, * indicate the significance level of 0.01, 0.05, 0.1, respectively, the standard error is adjusted by the company-level cluster, and the t value is in the parentheses.

4.4 Robustness Test and Endogenous Treatment

4.4.1 Robustness Test

The robustness test mainly examines the influence of the following factors on the empirical results:

4.4.1.1 Measurement of Trademark Internationalization

In this paper, the indicator of trademark internationalization is based on existing theories and models constructed by predecessors, measured by the number of international registered trademarks included in the Global Brand Database per 100 million yuan of assets. In the robustness test, the number of international trademark registrations included in the Global Brand Database is divided by the operating income to recalculate the trademark international registration intensity, and then the regression analysis is performed again. The results are shown in Table 7. It is found that when the trademark international registration intensity is replaced by the number of internationally registered trademarks divided by operating income, the data in column (1) of the table shows that the coefficient of trademark internationalization is 0.231, which is significant at the 5% level, indicating that the level of trademark internationalization can significantly increase the value of the enterprise; The data in column (2) shows that the coefficient of the crossover term lnFSTS×ITI between the degree of enterprise internationalization and the level of trademark internationalization is -0.159, which is significant at the 10% level, indicating that the degree of enterprise internationalization negatively regulates the relationship of trademark internationalization level and enterprise value. The data in column (3) and (4) show that the coefficient of the crossover term lnFSTS×ITI between the level of enterprise internationalization and the level of trademark internationalization is -0.181 in high-tech enterprises, which is significant at the 10% level, indicating the degree of internationalization of high-tech enterprises has a more significant negative regulatory effect on the relationship between trademark internationalization and enterprise value compared with non-high-tech enterprises. The above robustness test results still support the conclusion drawn above.

Table 7. Robustness test of trademark internationalization measurement

variable	(1)	(2) All	(3) Htfirm=0	(4) Htfirm=1
ITI	0.231**	0.823**	-1.092	0.828**
	(2.31)	(2.54)	(-0.85)	(2.30)
lnFSTS×ITI		-0.159*	0.529	-0.181*
		(-1.78)	(1.09)	(-2.03)
lnFSTS		-0.044	-0.263	-0.019
		(-0.74)	(-1.46)	(-0.32)
Fata	-1.766*** (-3.02)	-2.178***	-0.287	-2.180**
		(-2.76)	(-0.40)	(-2.52)

Inta	-7.683*** (-2.98)	-3.501	-3.650**	-3.132
		(-1.30)	(-2.78)	(-0.77)
LEV	-0.038	-0.065	-0.088	-0.068
	(-0.73)	(-1.31)	(-0.63)	(-1.30)
Size	-0.299*** (-3.66)	-0.282***	-0.182	-0.413***
		(-2.75)	(-1.37)	(-3.39)
Selerate	0.231*	0.085	0.295	-0.000
	(1.90)	(0.68)	(1.53)	(-0.00)
Fsrate	0.010*	0.010*	0.014	0.016***
	(1.93)	(1.97)	(1.33)	(2.92)
Sesa	2.141*	1.170	0.105	1.033
	(1.81)	(0.49)	(0.04)	(0.41)
Firmage	-0.105	-0.136	-6.463	-0.579*
	(-0.31)	(-0.48)	(-1.02)	(-1.86)
Htfirm	-0.084	0.058		
	(-0.40)	(0.26)		
cons	11.112***	10.703***	22.281	14.828***
	(4.91)	(3.64)	(1.41)	(4.17)
Ind	Control	Control	Control	Control
Year	Control	Control	Control	Control
pro	Control	Control	Control	Control
Adj R^2	0.612	0.706	0.814	0.712
N	570	431	106	325

Note: ***, **, * indicate the significance level of 0.01, 0.05, 0.1, respectively, the standard error is adjusted by the company-level cluster, and the t value is in parentheses.

4.4.1.2 Measurement of Enterprise Value

In order to avoid errors in the selection of variable indicators, this paper uses the return on assets (ROA) to test the model. The test results are shown in Table 8. Column (1) in the table shows that the coefficient of trademark internationalization level ITI is 0.028, which is significant at the 5% level, indicating that the trademark internationalization level has a significant positive correlation with enterprise value; column (2) shows that the coefficient of the crossover term lnFSTS×ITI between the degree of enterprise internationalization and the level of trademark internationalization is -0.016, which is significant at the 5% level, indicating that the degree of enterprise internationalization negatively regulates the relationship between the level of trademark internationalization and enterprise value; column (3) (4) data shows that the coefficient of the crossover term lnFSTS×ITI between the level of enterprises internationalization and trademark internationalization is -0.020 in high-tech enterprises, which is significant at the 1% level, indicating that the degree of internationalization of high-tech enterprises has a more significant negative regulatory effect on the relationship between trademark internationalization and enterprise value compared to non-high-tech enterprises. The above results show that the above conclusion is robust.

Table 8. Robustness test of enterprise value measurement

variable	(1)	(2)	(3)	(4)
		All	Htfirm=0	Htfirm=1
ITI	0.028**	0.064***	0.085	0.061***
	(2.61)	(3.47)	(0.79)	(3.11)
lnFSTS×ITI		-0.016**	0.002	-0.020***
		(-2.29)	(0.08)	(-3.32)
lnFSTS		-0.001	-0.016***	0.002
		(-0.26)	(-4.18)	(0.69)
Fata	-0.051*	-0.026	0.082	-0.070*
	(-1.82)	(-0.76)	(0.75)	(-2.03)
Inta	-0.215	-0.059	-0.294**	-0.050
	(-1.61)	(-0.39)	(-2.40)	(-0.22)
LEV	-0.013***	-0.014***	-0.017	-0.014***
	(-3.63)	(-2.89)	(-1.46)	(-3.10)
Size	0.005	0.006	-0.007	0.004
	(1.39)	(1.56)	(-0.82)	(0.62)
Selerate	0.030***	0.024***	0.029**	0.024**
	(4.30)	(3.42)	(2.44)	(2.55)
Fsrate	0.001**	0.001**	0.000	0.001**
	(2.33)	(2.03)	(0.44)	(2.39)
Sesa	0.003	-0.064	-0.469	-0.053
	(0.07)	(-1.01)	(-0.97)	(-0.95)
Firmage	0.027**	0.031**	0.145	0.029
	(2.44)	(2.40)	(0.35)	(1.61)
Htfirm	-0.009	0.004		
	(-1.05)	(0.43)		
cons	-0.135	-0.209*	-0.036	-0.185
	(-1.37)	(-1.77)	(-0.03)	(-1.00)
Ind	Control	Control	Control	Control
Year	Control	Control	Control	Control
pro	Control	Control	Control	Control
Adj R^2	0.487	0.524	0.679	0.558
N	570	431	106	325

Note: ***, **, * indicate the significance level of 0.01, 0.05, 0.1, respectively, the standard error is adjusted by the company-level cluster, and the t value is in the parentheses.

4.4.2 Endogenous Problems

There may be certain endogenous problems regarding the impact of the degree of enterprise internationalization on enterprise value in the development of trademark internationalization, that is, the degree of enterprise internationalization may in turn be affected by enterprise value. In order to solve the endogenous problem, this paper uses the two-stage least squares method (2SLS) to perform endogenous tests, and select the lagging period of internationalization as an instrumental variable based on the practice of Chen Limin and other scholars (2016) and bring it into the model (2) for estimation. First, the results of the DWH endogenous test show that the P

values are all less than 0.1,that is, the original hypothesis that the variable of the degree of enterprise internationalization is exogenous is rejected, indicating that the model (2) has an endogenous problem. Secondly, a weak instrumental variable test was performed on this instrumental variable. The weak instrumental variable under the overall sample is greater than 10, indicating that the one-period lag value has a strong explanatory power for the internationalization degree variable under the overall sample.

The results of the second stage of 2SLS are shown in Table 9. It can be seen from the column (1) of Table 9 that the lnFSTS×ITI coefficient of the overall sample is still negative after dealing with the endogenous problem, indicating that the degree of enterprise internationalization will negatively regulate the relationship between trademark internationalization and enterprise value., and the result has a certain degree of reliability; From the columns (2) and (3), it can be seen that the degree of internationalization of high-tech enterprises after sub-samples significantly negatively affects the relationship between trademark internationalization and enterprise value, which is consistent with the results before the endogenous treatment, indicating the results obtained before the endogenous treatment is robust.

Table 9. Endogenous treatment results

variable	Two stages		
	(1)	(2)	(3)
	ALL	Htfirm==0	Htfirm==1
ITI	1.648***	-6.065	1.668***
	(4.07)	(-0.97)	(3.76)
lnFSTS	-0.029	-0.762	-0.002
	(-0.36)	(-1.17)	(-0.03)
lnFSTS×ITI	-0.429***	2.324	-0.489***
	(-3.13)	(1.02)	(-3.48)
Fata	-2.083**	0.107	-1.993**
	(-2.41)	(0.16)	(-2.28)
Inta	-3.012	-3.271	-2.400
	(-1.18)	(-1.15)	(-0.64)
LEV	-0.023	0.021	-0.034
	(-0.63)	(0.12)	(-0.83)
Size	-0.305***	-0.394	-0.458***
	(-3.05)	(-1.21)	(-4.19)
Selerate	0.085	0.408*	-0.043
	(0.61)	(1.86)	(-0.29)
Fsrate	0.003	0.008	0.010*
	(0.62)	(0.73)	(1.78)
Sesa	1.989	-2.039	1.875
	(0.90)	(-0.50)	(0.84)
Firmage	-0.159	-12.686	-0.755**
	(-0.59)	(-1.12)	(-2.42)
Htfirm	-0.071		
	(-0.31)		
cons	10.312***	49.822	15.619***
	(3.02)	(1.30)	(4.40)
Ind	Control	Control	Control
Year	Control	Control	Control
pro	Control	Control	Control

R^2	0.326	0.107	0.386
N	382	94	288
Weak instrumental variable test	54.753	1.680	68.868
Hasen J test	0.000	0.000	0.000

Note: ***, **, * indicate the significance level of 0.01, 0.05, and 0.1, respectively. The standard error is adjusted by the company-level cluster, and the z value is in parentheses.

5. Conclusion and Enlightenment

This article takes Shanghai and Shenzhen A-share listed companies in western China from 2010 to 2019 as the research object, discusses and empirically tests the impact of trademark internationalization on enterprise value, and analyzes the moderating effect of enterprise internationalization on the relationship between trademark internationalization and enterprise value. The study found that the level of trademark internationalization positively affects enterprise value, but the degree of enterprise internationalization will adversely affect the relationship between the level of trademark internationalization and enterprise value. The reason is that western enterprises have a low degree of internationalization and may not be able to support excessive or premature cost input of trademark internationalization, which results in increased risks and uncertainties. In addition, the market has not moved, but the trademark acts first. Some enterprises in the western region have registered trademarks in the international market for the purpose of protecting intellectual property rights. They have not yet applied and managed the trademarks further, resulting in inefficient use of trademarks. Further we divide the listed enterprises in the western region according to their technical characteristics, and conclude that the degree of internationalization of western high-tech enterprises significantly negatively affects the relationship between the level of trademark internationalization and enterprise value. The reason is that the degree of internationalization of western high-tech enterprises is relatively low, leading to the investment cost of trademarks is greater than the benefits of current trademarks; or the western high-tech enterprises have not deeply explored the value of international trademarks.

The conclusions of this article have enriched related researches, and also have certain practical significance:

(1) Western enterprises should actively build international trademark based on their own characteristic industrial advantages. On the one hand, trademark internationalization eases the problems of information asymmetry and trademark externalities faced by western enterprises due to regional restrictions; on the other hand, it helps to urge enterprises to always pay attention to product quality and avoid negative chain effects caused by bad behaviors to expand and damage enterprise value.

(2) Trademark internationalization of western enterprises should match their own degree of enterprise internationalization, so as to avoid cost accumulation and waste of resources caused by premature or excessive investment. Western enterprises should make overall plans based on the global concept and strengthen the budget management of trademark internationalization to adapt to the process of enterprise internationalization; at the same time, they should accumulate relevant international experience and resources in the development process to provide guarantee for in-depth exploration and cultivation of the value of trademarks in overseas markets.

(3) Western high-tech enterprises should pay attention to the layout of the international trademark strategy in the process of internationalization. With the acceleration of the global flow of production factors, international development is a necessary link for high-tech companies to integrate resources and improve their independent innovation capabilities. The level of trademark internationalization is closely related to the degree of enterprise internationalization. The comprehensive layout of the international trademark strategy is conducive to the discovery of the investment value of high-tech enterprises as soon as possible and to obtain more development opportunities.

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Notes

Note 1. According to "*China Statistical Yearbook*"

Note 2. Trademark internationalization refers to the development process of companies establishing trademark assets

Note 3. https://www3.wipo.int/branddb/en/

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