

# Research on the Relationship between Levels of Diversification and Enterprise Performance of Real Estate Listed Companies

Jindi Yang

Beijing Normal University  
School of Government  
Beijing China  
201821260024@mail.bnu.edu.cn

Shilin Li

Beijing Normal University  
School of Government  
Beijing China  
201611260226@mail.bnu.edu.cn

Hongping Lian\*

Beijing Normal University  
School of Government  
Beijing China  
\*hplian@bnu.edu.cn

**Abstract**—This empirical study selects listed companies in the real estate industry as the research object, employs its 2012-2016 information to establish non-balanced panel data, investigates the relation between the levels of company's diversification and enterprise performance and concludes that the level of diversification of real estate listed companies is negatively correlated with enterprise performance. Specifically, the level of diversification of single-business, dominant-business, and low-degree unrelated business has no significant relation with enterprise performance. Highly unrelated diversification is significantly negatively correlated with enterprise performance. After adding the quadratic term of the indicator of the independent variable, this study indicates that, under certain conditions, the increase in level of diversification can help improving enterprise performance. Therefore, real estate listed companies should pay more attention to related industries when implementing the diversification strategy, and controlling the degree of diversification within a certain range.

**Keywords**—Real estate company; Level of Diversification; Enterprise performance

## I. INTRODUCTION

The real estate industry is related to the people's livelihood and many related industries. It is the most important pillar industry of China's national economy. According to the "Government Working Report" over the years, it can be seen that stabilizing housing consumption, reducing the number of unsold homes, renovation of shanty towns, housing for living in, curbing housing prices, and improving real estate tax legislation all show the government's determination to strengthen the regulation of the real estate industry continuously. In 2018, the market value of the real estate sector evaporated by about 500 billion yuan, and the market-to-book ratio hit a five-year low. Among the TOP3 housing enterprises, HengDa invested in new energy vehicles across the boundary. BiGuiyuan established the modern

agricultural company and the robot company. WanKe immediately positioned itself as "urban and rural construction and living service providers." In addition, nearly 20 real estate companies removed the word "real estate" by renaming, which means the adjustment and change of the company's development strategy. From this point of view, whether it is forced by the situation or the needs of enterprise development, diversification has become an important strategic choice for the development of real estate enterprises.

In this context, this study selects listed companies in the real estate industry as the research object, employs its 2012-2016 information to establish non-balanced panel data, and analyzes the relationship between diversification and enterprise performance. As the SFC's annual industry classification adjusts every year, the establishment of non-balanced panel data for research is more suitable for the actual situation.

## II. RELATED LITERATURE

### A. Aspects of diversification

International researches on diversification focus mainly on diversified categories, the impact of diversification on corporate performance, the value of diversification strategies, the relationship between diversification strategies and core competencies, the factors affecting diversification strategies and the measurement of diversity degree, etc.

Anoff (1957) and Rumelt (1974) used strategic classification method to measure the degree of diversification<sup>[1][2]</sup>; Gort M (1962) firstly used the metrology to focus on the concentration of business operations<sup>[3]</sup>; the current indicators for measuring the degree of diversification are as follows:

Number of business units: The number of business units is only measured as "quantity" and the results are not specific.

SIC coding system: The SIC code consists of four digits, the first two representing the industry and the last two representing the specific business unit in the industry.

Herfindahl index and entropy index: Compared to the number of business units and SIC coding, the Herfindahl index and the entropy index take the imbalance in the number and distribution of firms in different industries/businesses into account.

### *B. Aspects of enterprise performance*

Most scholars basically divide corporate performance into profitability, shareholder profitability and development capability. The main measurement indicators include total return on assets, return on net assets and earnings per share, sales profit margin, main business growth rate, Tobin Q value, EVA, balance score card and sustainable development rate. Tobin's Q value was first proposed by James Tobin. Wernerfelt and Montgomery (1988) used the Tobin Q value as an indicator to measure firm performance for the first time<sup>[4]</sup>. Comment and Jarrell (1995) measured the changes in corporate excess returns before and after the implementation of the diversification strategy<sup>[5]</sup>. The excess value method was first adopted by Berger and Ofek (1995)<sup>[6]</sup>.

### *C. Aspects of relationship between levels of diversification and enterprise' performance*

There are two main opinions on the relationship between the level of diversification and enterprise 'performance at home and abroad.

One opinion believed that there is a positive relationship between diversification and corporate performance in terms of risk, taxation, and capital circulation. Lewellen (1971) believed that the company's diversification strategy had advantages in reducing corporate risk and taxation<sup>[7]</sup>; Myers and Majluf (1984) believed that company had sufficient funds to invest in good projects under diversification strategy<sup>[8]</sup>; Zhu Jiang (1999) studied more than 100 companies, and found that diversification reduced the risk of the company's operation<sup>[9]</sup>; Cheng Yong and Xu Kangning (2006) based on the process of research on "optimal diversification level" and found that increasing the diversification of enterprises would reduce business risks<sup>[10]</sup>.

Another opinion believed that the company's diversification strategy was not conducive to the improvement of corporate performance in terms of repeated investment and discount effect. Berger and Ofek (1995) studied more than 3,000 companies and found that companies implementing diversification strategies were more prone to over-investment and repetitive investment, which led to a decline in corporate performance<sup>[6]</sup>; Qin Bin and Xiao Kun (2013) studied all listed companies that issued A shares in Shenzhen and Shanghai before 2003 and found diversification strategy had a discount effect on corporate value<sup>[11]</sup>.

## III. RESEARCH HYPOTHESIS

Principal-agent theory believes that diversification gives company managers greater power to diversify the risk of individual portfolios and damages the rights and interests of company owners. The "information asymmetry theory"

believes that diversification inevitably makes the company set up multiple departments responsible for different businesses and a large management system affects efficiency and reduces corporate performance. The effect of discounts is that after the implementation of the diversification strategy, the distribution of resources by enterprises is arbitrary and not conducive to corporate performance. From this point of view, enterprises have a diversified strategy, which is likely to fall into a dilemma of diversification. It makes the business advantage of the original field scattered and can't find a foothold in the new field, which is prone to over-investment, cross-investment and low efficiency problem. Based on the above theories, this paper proposes the following assumption.

H1: The level of diversification of real estate listed companies is negatively correlated with enterprise' performance.

The idea of measuring the degree of diversity with relevant diversification and irrelevant diversification was first proposed by Rumelt (1974)<sup>[2]</sup>. Through analyzing of large American companies, Rumelt found that the core functions of enterprises being limited in resource extension and resource sharing, and implementing non-related pluralism reduced corporate performance; Comment and Jarrell (1995) researched listed companies of NYSE and AMEX between 1978 and 1989 and concluded that the more concentrated the company's operating units, the higher the stock yield<sup>[4]</sup>. In combination with the above scholars' views, the following assumption is made.

H2: Compared with non-related diversification, relevant diversification has a stronger positive correlation with corporate performance.

Grant (1988) believed that the number of business units had a positive impact on corporate performance, but beyond a certain range, it would have a negative impact on company performance<sup>[12]</sup>; Su Shi, Liu Yulong (2017) divided corporate diversification into industry diversification and product diversification and concluded that product diversification and corporate performance had an inverted "U" relationship<sup>[13]</sup>. Therefore, this paper proposes the following assumption.

H3: There is an inverted "U" shaped relationship between diversified management of real estate listed companies and corporate performance.

## IV. EMPIRICAL RESEARCH

### *A. Data Collection and Selection*

This paper selects all real estate listed companies that only issue A shares in Shanghai and Shenzhen stock markets as research samples, taking 2012 to 2016 as sample observation period. These companies belong to the real estate industry in the "Guidelines for the Classification of listed companies" issued by the China Securities Regulatory Commission.

### *B. Variable description*

This paper selects three indicators: business unit, Herfindahl index and entropy index to measure diversification. The reason is that even though the number of cross-industry operations of the two companies is the same, the proportion of the company's operating income is different. Hence, the degree

of diversification is different. The more business units, the smaller the Herfindahl index, the larger the entropy index, the higher the company's diversification.

This paper measures corporate performance using profitability and shareholder profitability. Considering the availability of data, this paper chooses the return on total assets, return on equity, and earnings per share as explanatory variables.

In the selection of control variables, seven indicators were preliminary selected: the Equity concentration Herfindahl index (H10), owner's equity growth rate (EQU), controller change (CON), asset turnover (CTUR), company size (Size), company age (Age) and asset-liability ratio (Lev). The correlation analysis showed that correlation coefficients between H10, EQU, CON, CTUR and dependent variable were low (less than 0.15) and were not significant, so they were eliminated, and finally retains Size, Age, Lev as control variable.

TABLE I. VARIABLE DEFINITION TABLE

Variable type	Variable name	symbol	Variable definition
Independent variable	Number of business units	Unit	Cross-industry number of company operating income
	Herfindahl Index	H	The sum of square of the proportion of sales revenue of each business unit in the company's operation to the total sales revenue
	Entropy index	En	$En = \sum_{i=1}^n P_i \ln(1/P_i) * 100\%$ $P_i$ represents the proportion of sales revenue of each business unit in the company's operation to the total sales revenue
Dependent variable	Return on total assets	ROA	Return on total assets = net profit / average total assets × 100%
	Return on equity	ROE	Return on equity = net profit / average net Assets × 100%
	Earnings per share	EPS	Earnings per share = net income for the year / total number of ordinary shares × 100%
Control Variable	Company size	Size	The natural logarithm of the company's total assets
	Company age	Age	The time elapsed since the company was founded
	Asset-liability ratio	Lev	Total liabilities / shareholders' equity

C. Research model

In order to examine the relation between diversification and enterprise performance, the theoretical model I is constructed as follows:

$$Y = a_0 + a_1 X_i + a_2 C_1 + a_3 C_2 + a_4 C_3 + u \quad (1)$$

Among them, Y is the company's operating performance, measured by the total return on assets, return on net assets and earnings per share.  $X_i$  represents the degree of diversification of the company. This paper uses the mean value of diversified operating level indicators of listed companies in the real estate industry from 2012 to 2016 to measure.  $C_1-C_3$  is the control variable, it stands for Size, Age, and Lev;  $a_1-a_4$  is the coefficient, the coefficient is positive for positive correlation, and is negative for negative correlation.

In order to examine the relation between various types of listed companies and corporate performance, this paper constructs a theoretical model II as follows:

$$Y = a_0 + a_1 X_i + a_2 C_1 + a_3 C_2 + a_4 C_3 + u \quad (2)$$

Among them, Y is the index for measuring the performance of the enterprise.  $X_i$  is Herfindahl index which measures the type of the enterprise,  $C_1-C_3$  is the control variable, which represents Size, Age, and Lev.  $a_1-a_4$  is coefficient, the positive coefficient means positive correlation, and the negative coefficient means negative correlation.

In order to verify whether there is a nonlinear relationship between diversification and corporate performance, the theoretical model III is constructed as follows:

$$Y = a X^2 + bX + C \quad (3)$$

Among them, Y represents the enterprise performance index, X is the diversification degree measurement index, a, b is the coefficient, and C is the constant term.

V. DATA ANALYSIS AND CONCLUSION

The data are all from the WIND database, and is analyzed by Stata software. In addition, in order to avoid the impact of extreme values, this paper has 1% winsorize processing of enterprise performance indicators and asset-liability ratio.

A. Descriptive analysis

As can be seen from TABLE II, the average number of operating units of these listed companies is no more than three, the average value of the Herfindahl index is 75%, and the average entropy index is 41.2%. It can be seen that these listed companies have little diversification.

**TABLE II. DESCRIPTIVE ANALYSIS OF EACH VARIABLE INDICATOR**

Variable	Number of samples	Mean	Std. Dev.	Min	Max
ROA	561	0.0286	0.0329	-0.0717	0.152
ROE	561	0.0945	0.103	-0.343	0.426
EPS	561	0.392	0.441	-0.780	1.960
Unit	561	2.934	1.605	1	11
H	561	0.750	0.223	0.000546	1.000
En	561	0.412	0.375	1.58e-05	1.830
Size	561	23.26	1.331	19.42	27.45
Lev	561	0.655	0.162	0.158	0.926
Age	561	21.00	4.587	9	36

This paper refers to Yun Lina (2006) and group companies according to the level of the Herfindahl index, more details as follows:

**TABLE III. CLASSIFICATION OF COMPANIES ACCORDING TO THE HERFINDAHL INDEX**

Herfindahl index	Group
>=95%	Single business company
70%<=H<95%	Leading business company
50%<=H<70%	Low irrelevant diversified company
H<50%	Highly irrelevant diversified company

After grouping listed companies in the real estate industry according to the above criteria, the number of companies diversified in each category from 2012 to 2016 is as follows:

**TABLE IV. NUMBER OF COMPANIES DIVERSIFIED IN EACH CATEGORY IN 2012-2016**

	2012	2013	2014	2015	2016	total
Single business company	26	26	24	17	18	111
Leading business company	43	45	47	47	59	241
low irrelevant business company	22	22	22	26	15	107
Highly irrelevant business company	22	20	19	19	22	102
total	113	113	112	109	117	561

As can be seen from the TABLE IV, the implementation of diversification strategies is common in these listed companies, but the degree of diversification is generally low.

### B. Correlation analysis

In order to investigate the relation and multicollinearity problem between the independent variable and the dependent variable, this paper analyzes the correlation of variables.

As shown in table V, the three indicators that measure the degree of diversification of the company are relatively high in correlation, which verifies the correctness of the choice of independent variable indicators. There are some correlations between the three indicators of explanatory variables and the three indicators of the explanatory variables, but the correlation coefficients are not high, basically no more than 17%,

**TABLE V. CORRELATION ANALYSIS BETWEEN VARIABLES**

	ROA	ROE	EPS	Unit	H	En	Size	Lev	Age
ROA	1								
ROE	0.812	1							
EPS	0.609	0.775	1						
Unit	-0.0760	-0.0512	0.00620	1					
H	0.112	0.169	0.136	-0.504	1				
En	-0.0968	-0.142	-0.0967	0.699	-0.929	1			
Size	0.0516	0.324	0.533	0.155	0.137	-0.0737	1		
Lev	-0.191	0.159	0.186	0.0409	0.203	-0.184	0.592	1	
Age	0.108	0.0544	0.0979	0.142	-0.0952	0.107	0.0341	-0.0602	1

### C. Regression results and analysis

**TABLE VI. REGRESSION RESULTS OF ENTROPY INDEX AND FIRM PERFORMANCE IN HIGHLY IRRELEVANT DIVERSIFICATION**

	ROA	ROE	EPS
En	-0.116*** (0.0312)	-0.339*** (0.0863)	-0.970*** (0.320)
Size	0.0202** (0.00977)	0.0701** (0.0271)	0.255** (0.100)
Lev	-0.192*** (0.0530)	-0.345** (0.147)	-1.015* (0.543)
Age	-0.00899*** (0.00281)	-0.0275*** (0.00780)	-0.0794*** (0.0289)
Constant	-0.0148 (0.187)	-0.401 (0.519)	-2.279 (1.922)
Observations	102	102	102
R-squared	0.363	0.324	0.231

Cont. to TABLE VI			
Number of code	38	38	38
F(4, 60)	8.53	7.20	4.50
Sign.	0.0000	0.0001	0.0030

Note: Standard error in parentheses  
\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

In this paper, the F-test and the Hausman test are used to select model (the mixed OLS model, the fixed-effect model or the random-effect model.). After testing, it is more suitable to establish a fixed-effect model.

According to the regression analysis of the data, generally, the number of business units does not have a significant impact on corporate performance and the increase of diversification of the enterprise will reduce the business performance. Specifically, the coefficients of the diversification degree of the single-service company, the leading business company and the low irrelevant diversified company do not pass the significance test. While the coefficient of the diversification of

the enterprise in the highly irrelevant diversification passes the significance test. That is, the diversification does not have significant impacts on business performance in the single business, dominant business and low unrelated diversification, but the highly irrelevant diversification will reduce the business performance of the enterprise significantly (TABLE VI.).

D. Nonlinear relationship test

In this paper, the quadratic term of diversification index is added to the full sample model. In the regression result of entropy index to business performance, the coefficient of the quadratic term of entropy index is negative and passes the significance test.

TABLE VII. NONLINEAR RELATIONSHIP BETWEEN ENTROPY INDEX AND FIRM PERFORMANCE

	ROA	ROE	EPS
<b>En</b>	0.0116	0.0693	0.325*
	(0.0166)	(0.0514)	(0.166)
<b>En<sup>2</sup></b>	-0.0320**	-0.119***	-0.390***
	(0.0137)	(0.0422)	(0.136)
<b>Size</b>	0.0139***	0.0521***	0.196***
	(0.00340)	(0.0105)	(0.0339)
<b>Lev</b>	-0.111***	-0.183***	-0.677***
	(0.0167)	(0.0516)	(0.166)
<b>Age</b>	-0.00473***	-0.0181***	-0.0429***
	(0.00102)	(0.00315)	(0.0102)
<b>Constant</b>	-0.119*	-0.608***	-2.842***
	(0.0629)	(0.194)	(0.626)
<b>Observations</b>	561	561	561
<b>R-squared</b>	0.124	0.098	0.090
<b>Number of code</b>	118	118	118
<b>F</b>	12.36	9.49	8.66
<b>Sign.</b>	0.0000	0.0000	0.0000

Note: Standard error in parentheses  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

The results show that the diversified operation of real estate listed companies and corporate performance have a "U"-type relationship. When the diversified operation level is controlled at 18% or less, the improvement of diversification will help improving corporate performance.

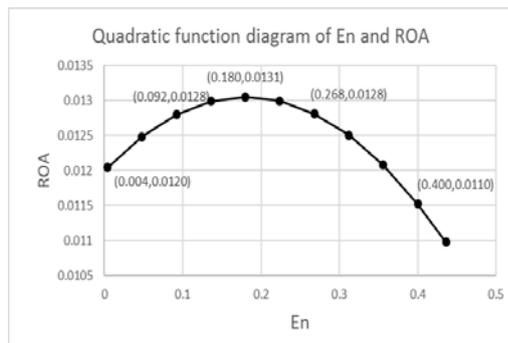


Fig. 1. Relationship between entropy index and total return on assets

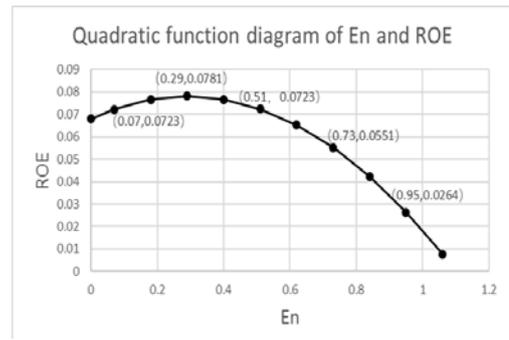


Fig. 2. Relationship between entropy index and return on net assets

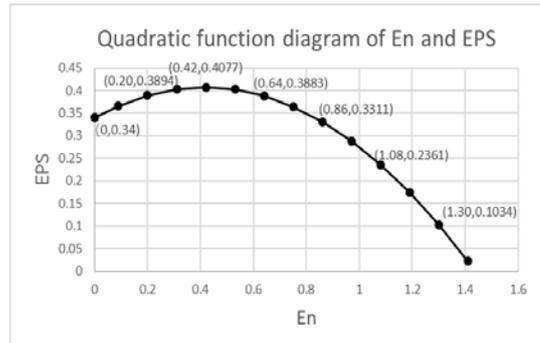


Fig. 3. Entropy index and earnings per share

VI. CONCLUSIONS AND SUGGESTIONS

After the empirical analysis, all three hypotheses have been verified. When implementing a diversification strategy, real estate listed companies should avoid blind diversification and blind unrelated diversification, pay attention to the company's diversified structure, increase the correlation of the company's internal industry (business) and combine its own actual situation, not blindly expanding the business implement a diversification strategy within the appropriate scope.

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