Operating ecology and financial risk analysis of the real estate industry——Empirical analysis based on SWOT-PEST analysis and the F-Probit model

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Abstract. In the context of "no speculation" in China, the survival environment of real estate developers is increasingly complex, and the real estate industry has been declining. Based on this, this paper uses SWOT-PEST analysis to study the business ecology of China's real estate industry, and it uses the F score model to analyze the financial risk of 9 real estate enterprises, and finally uses the Probit regression model and stability test to analyze the influencing factors of profits and total assets of the real estate industry. After studying, the conclusions are as follows: (1) China's real estate industry is still not over despite the downturn. (2) the financial risk of most real estate enterprises is increasing year by year. Although there is no bankruptcy crisis, it should not be underestimated. (3) the liquidity level and cumulative profitability of enterprise assets are important factors affecting the assets and profits of enterprises.

Keywords: operating ecology; financial risk; real estate industry; SWOT-PEST analysis; F score model; Probit regression model.

1. Introduction

In January 2021, the "two red lines" officially were implemented, and the real estate tax will be piloted in 2022. Implementing these policies has determined the "room not fry" tone. The tone also accords with "achieving common prosperity" in China. Is the real estate industry coming to an end in this environment, and are real estate companies facing bankruptcy? This paper examines the business ecology of the real estate industry, the financial risks of real estate firms,and the factors that affect the profits and assets of real estate firms.

In theory, this paper uses SWOT-PEST to analyze the real estate business ecology, which is more comprehensive by multi-dimensional analysis. Second, the empirical analysis uses the F score model and Probit regression model to achieve quantitative analysis. In practice, the data used in the empirical analysis come from nine enterprises with different levels, which can better reflect the level of the current Chinese real estate industry. The main contributions of this paper are a more comprehensive analysis and a theoretical reference for the real estate industry.

2. Literature review

2.1 Internal ecology and external ecology operated by the company

In the ERM Framework, COSO states that the internal environment of an enterprise is the basis of all other risk management elements, so that the internal ecology of business operations can start from the company's internal environment. The guidelines on the Application of Internal Control in Enterprises issued by the Chinese Ministry of Finance and five other ministries and commissions in 2010 explain its composition's main elements from five aspects[1].In order to have sustainable development, an enterprise should ensure a good internal environment, and combine it with the external environment. The development strategy should fully consider the external ecology.

Analyze the external environment of the company's development, including macro-environment, meso environment, and microenvironment. PEST model can analyze the external macro-environment; The five industrial competitiveness analysis models proposed by Michael Porter can analyze the

industrial environment; The microscopic environment analysis directly analyzes the competitors of the company, and the common theory is the competitor analysis model proposed by Michael Porter[2].

2.2 The Company's financial risk analysis

One can use balance sheets, income statements, and cash flow statements as data sources by calculating traditional financial indicators to judge the potential financial risks in different aspects or directly analyze financial statements; This can be done with models. For example, Altman (1968) constructed the Z-Score model to judge the current financial situation of an enterprise according to the z-score calculated by the financial index "[3].

2.3 Literature Review

It can be seen that the research on the internal and external ecology and financial risk analysis of the company's operation is rich, and the relevant explanations are comprehensive and have become a system. In general, foreign scholars' studies are earlier and have remarkable results for posterity and domestic scholars to learn.

However, most relevant theories are analyzed in one dimension. In order to make a more comprehensive analysis of the real estate industry, this paper combines SWOT with PEST. It then uses the improved financial risk analysis of the Z model method, namely the F score model, for real estate enterprises, achieving both qualitative research and quantitative analysis.

3. Ecological Analysis of Property Industry Operation based on SWOT-PEST Analysis

The business ecology of the real estate industry is now analyzed using SWOT-PEST analysis, as shown in the following table

Table 1 Ecological Analysis of Real Estate Industry Operations based on SWOT-PEST analysis

SWOT-PEST	Politics	Economy	Society	Technology
Strengths	Policy steady	Small cities benefit	Urbanization is not over	Wide choice of transformation
Weaknesses	Moreinventory	Financing is bad	Generation Z rises	Funding sources are limited
Opportunities	property tax	Focus on other projects	Commercial real estate positive	Good property service
Threats	One city, one policy	Poor industrial structure	Population aging	Industry pain

3.1 Advantages of the real estate industry

The advantages of the real estate industry are mainly in four aspects: First, in terms of the policy, macro-policy regulation will remain stable, so the risk will not fluctuate too much[4]. Second, in terms of the economy, some scholars have studied the spatial layout characteristics of real estate enterprises in China[5], from which it can be inferred that there is still market space in third and fourth-tier cities. Third, in terms of social and natural factors, China's urbanization continues, which indicates that housing will still be a big problem[6]. Fourth, in terms of technology, real estate enterprises may use their advantages to make a timely transformation. Large enterprises may transform to apartment housing, commercial real estate, and property service, while small enterprises do agent construction of projects.

3.2 Disadvantages of the real estate industry

The disadvantages of the real estate industry mainly lie in four aspects: First, in terms of policy, the implementation of the destocking policy is unsatisfactory, and the industry still faces the risk of excess inventory, leading to more extended capital recovery periods and increased financial risks[7]. Second, in terms of the economy,the real estate industry lacks financing channels, and financing will only become much more difficult in the event that companies experience financial difficulties[8]. Third, in terms of social and natural factors, "Generation Z" tries to choose to rent as much as possible[4]. Fourth, in terms of technology, some enterprises cannot guarantee the recovery of payments, and the enterprises will be caught in a vicious circle of business failure.

3.3 Opportunities in the real estate industry

There are four main opportunities for the real estate industry: First, in terms of the policy, the introduction of the real estate tax is to restrain the behavior of housing stock and speculation, which will accelerate the circulation of idle resources[4]. Second, in terms of the economy, the overall demand of the city may have been met, but there may still be some opportunities in some parts of the city. Third, in terms of social and natural factors, commercial demand is constantly changing and appreciating, which provides the direction of transformation for traditional real estate developers. Fourth, in terms of technology, property service will be an essential direction for real estate companies to transform in the future, and the future development direction of property management enterprises is to combine with the Internet, which can reduce enterprise costs[9].

3.4 Threats in the real estate industry

There are four main threats to the real estate industry: First, in terms of the policy, policies may vary greatly from city to city, and real estate developers cannot adopt one strategy to deal with the national market. Second, the real estate industry accounts for too much of the economic terms of the economy. A real estate-driven economy will become a thing of the past[4].Third, China now has an aging population and insufficient housing purchasing power regarding social and natural factors. Fourth, in terms of technology, the adjustment of the real estate industry will go through a relatively long-term, painful process, and the survival of enterprises is the biggest problem.

4. Financial risk analysis of the real estate industry

In this section, the F score model is used to analyze the financial risk of our real estate industry for the following reasons: (1)The F score model is based on the Z score model, with an expanded sample size and newly defined metrics. (2)The five indicators of the F score model can reflect the financial risk status of the enterprise from the perspective of debt repayment, profit, operation, and cash flow and make the financial risk early warning[10]. (3)The F score model uses data from multiple indicators to provide a more comprehensive analysis of financial risk. The formula for the F score model and the explanation of variables are as follows:

$$F = -0.1774 + 1.1091X1 + 0.1074X2 + 1.9272X3 + 0.0302X4 + 0.4961X5$$

Table 2 F score model variable interpretation

Symbols	Represents the meaning
X_1	The liquidity level and solvency of the enterprise assets
X_2	Reflect the cumulative profitability of the enterprise
X_3	Cash flow variables debt ability
X_4	It reflects the basic financial structure of an enterprise
X_5	The ability of the total assets to create the cash flow

To study the F score trend of real estate companies using the Oriental Wealth Network, we viewed several real estate companies' balance sheets, income statements, and cash flow statements from 2016

to 2020. It was selected nine companies for analysis. Country Garden, Wanda Commercial Management, and Greenland Holdings have good profits, Sunac China, R & F Real Estate, and Sunshine City have medium profits, Lujiazui, Huayuan Real Estate, and Xintiandi Property Group have poor profits. The data are obtained from the official website financial results, and the 2020 F score table is calculated as follows:

Table 3 9 Business results of F score

	X1(2020)	X2(2020)	X3(2020)	X4(2020)	X5(2020)	F score (2018)	F score (2019)	F score (2020)
Country Garden	0.123	0.063	0.033	0.073	0.032	0.0523	0.0609	0.0471
Wanda Group	0.037	0.425	0.379	1.044	0.382	0.2374	0.1889	0.1908
Greenland holding	0.145	0.046	0.022	0.045	0.023	0.0749	0.0672	0.0426
Sunac China	0.136	0.088	0.062	0.036	0.056	0.0616	0.0679	0.1308
R & F real estate	0.194	0.165	0.032	0.037	0.020	0.2099	0.2313	0.1277
Sunshine city	0.237	0.050	0.021	0.045	0.020	0.2086	0.2194	0.1419
Lujiazui	0.003	0.156	0.079	0.647	0.064	0.0588	0.0176	0.0459
Huayuan	0.272	0.079	0.007	0.102	0.003	0.2860	0.2254	0.1504
Xintiandi Group	0.334	0.401	-0.077	0.069	-0.058	0.2542	0.0475	0.0622

The threshold for the financial risk warning of the F score model is 0.0274. If the calculated score is less than 0.0274, the company is considered bankrupt. If the score is higher than 0.0274, the financial risk is still under control[10]. As shown in Table 3, the F scores of six of the nine companies in the last three years are decreasing year by year, and the financial risk is increasing year by year. Four companies with F scores in 2020 do not have high scores, close to 0.0274. Even large companies, such as country gardens, and green land holdings, do not have high F scores. Although they are not bankrupt, they also have some financial risks.

5. Empirical analysis of the factors affecting the profit and total assets in the real estate industry

5.1 Factors affecting the profits and total assets of the real estate industry

This paper analyzes the influencing factors of the property industry profits and total assets by using the Probit regression model. The Probit regression model analysis is based on the data to analyze the causal relationship between the dependent and independent variables[11]. Therefore, this paper uses the Probit regression model, with the liquidity level of the enterprise assets as the independent variable X1 and the cumulative profit status of the enterprise serving as the independent variable X2. The total cash flow generated by the enterprise can be used to repay the enterprise debt as an independent variable X3, the total assets of the enterprise serve as the dependent variable Y1, and the profits of the enterprise serve as the dependent variable Y2. The influencing factors of profits and total assets in the real estate industry are analyzed.

Based on the nine companies in Table 3, 45 sample sizes were obtained from the five annual report data for 2016-2020, as shown in Table 4.

Table 4 Descriptive Statistics

	Minimum	Maximum	Mean	Std.Deviation
Y1	32.980	20200.000	5102.918	5217.873
Y2	-1.910	612.020	157.314	178.410
X1	-0.109	0.523	0.203	0.148
X2	0.032	0.557	0.159	0.150
X3	-0.097	0.379	0.042	0.063

The above data were standardized using SPSS software, and the following results were obtained from the Probit regression model for Y1 and Y2 using Stata software:

Table 5 Influactors for Profit and Total Assets in Real Estate Industry-Probit model

	Conficient		Std.err.		P>|z|	
	Y1	Y2	Y1	Y2	Y1	Y2
X1	-0.5932	-0.5662	0.1823	0.1796	0.001	0.002
X2	-1.0887	-0.8146	0.2393	0.2182	0.000	0.000
X3	0.2579	0.5485	0.1857	0.1978	0.165	0.006

The results of the analysis in the table show that the liquidity level of the enterprise's assets and cumulative profitability directly affect the level of the enterprise's total assets, and there is a significant correlation; The liquidity level of the enterprise's assets, cumulative profitability, and the enterprise's cash flow directly affect the enterprise's profitability, and there is a significant correlation.

5.2 Robustness test of the factors affecting the profits and total assets in the real estate industry

To further test the robustness and reliability of the level of corporate asset liquidity and retained earnings on the total assets of the enterprise, the robustness and reliability of the level of corporate asset liquidity, the status of retained earnings, and the level of cash flow on the profitability of the enterprise[12], this paper mainly tests the robustness from the following aspects. First, the two models mistiest the robustness criteria; Second, model the data again with Logit to test their stability.

X1 and X2 are still significant to Y1 and Y2 in the Logit model, while X3 is no longer significant to Y2 in the robustness standard mistiest and Logit model. It can be seen that X3 is not robust to Y2, and X1 and X2 have passed the robustness test for Y1 and Y2.

6. Conclusions and Policy Implications

6.1 Conclusions

Based on the above analysis, three conclusions are obtained. Three conclusions are as follows:

(1) China's real estate industry is still yet to end. After SWOT-PEST analysis, there is still room for real estate companies to produce. For example, real estate enterprises can actively transform into apartment real estate, property services, and asset-light.

(2) The financial crisis of Chinese real estate enterprises should not be underestimated. As can be seen from the F score of 9 real estate enterprises in the past three years, the financial risks of most enterprises in the real estate industry have increased year by year in recent years.

(3) A company's current assets and retained earnings are important influences on a company's assets and profits. According to the Probit regression model and robustness test, the liquidity level and cumulative profitability of enterprise assets are significantly correlated with the assets and profits of enterprises.

6.2 Policy Implications

(1)The government provides policy preferences to help enterprises transition actively. For example, the government and trust funds can cooperate with transforming enterprises to broaden financing channels for transforming enterprises.

(2)Although the real estate industry has not fallen, this time should be timely to find transformation opportunities. Otherwise, financial risk will increase.

(3)Real estate companies should pay attention to current assets and retained earnings in the process of development.

References

[1] Chi Guohua, Zhu Rong.Internal Control and Risk Management (2nd Edition) [M].Beijing: China Renmin University Press, 2018:95.

[2] Li Peiqiang.Enterprise Strategy Management [M].Shanghai: Shanghai Jiao Tong University Press, 2015.

[3] Altman E.I.Financial Ratios,Discrimi nant Analysis and the Prediction of CorporateBankruptcy[J].The Journal of Finance, 1968 (23): P589-609.

[4] Yang bo.The —— is based on PEST analysis [J].Contemporary Economy, 2022,39 (01): 50-61.

[5] Ji Yufan, Dai Liang, Ding Zijun, Zhou Teng.Structural Characteristics of Urban Real Estate Enterprise Network in China [J].Resource Development and Markets, 2022,38 (02): 156-162.

[6] Ba shusong,Yang Xianling.The future development of real estate market from the major trend of urbanization[J].Dongyue Series,2020,41(02):5-16+ 191.

[7] Ding Zhiguo, Zhang Yan, Ren Haofeng, Xu Decai.Research on the "destocking" effect of supply-side structural reform on the real estate industry [J].Journal of Central South University (Social Science Edition), 2022,28 (01): 83-99.

[8] Jiang Yifan. Research on the financial performance of Wanda Commercial's asset-light operation model[D]. Jiangxi Normal University,2020.

[9] Wei Longfei.TX Real Estate Company Strategic Transformation Research [D].Qingdao University, 2020.

[10] Zhou Shouhua,Yang Jihua, Wang Ping.On the early warning analysis of financial crisis,—— F score model [J].Accounting Research,1996(08): 8-11.

[11] Liu Kang, Li Yue'e, Wu Qun, Shen Jianfen.—— takes Nanjing as an example [J].Journal of Applied Ecology, 2015,26(07):2131-2138.

[12] Liang Haibing,Zhang Hua.Income gap within villages and rural human trust——based on dual Probit model[J].Agricultural technical economy: 1-20.