

Research on Financial Risk of Listed Real Estate Enterprises in the Pearl River Delta - Based on Factor Analysis

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Abstract: Against the backdrop of macroeconomic transformation, policy tightening, and shrinking demand, China's real estate industry has entered a period of profound adjustment. Developers in the Pearl River Delta region are facing multiple challenges, including declining investment, weak sales, and intensified financial risks. Based on data from 32 A-share listed companies in 2023, this study conducts KMO tests and Bartlett tests on 14 key indicators (such as long-term debt-to-asset ratios and current ratios), followed by factor analysis to construct a four-dimensional risk model encompassing profitability, solvency, operational status, and growth potential. Factor scores rank real estate companies and categorize them into four quartiles: safe zone, observation zone, warning zone, and danger zone. The study draws eight core conclusions: companies in the safe zone should optimize their capital structure, those in the observation zone need to strengthen cash flow management, companies in the warning zone should advance debt restructuring, and those in the danger zone must implement strategic transformation. Through systematic safeguard mechanisms—including institutional frameworks, technological applications, regulatory norms, and mindset shifts—the framework is transformed into actionable guidelines for enhancing financial risk management standards.

Keywords: Real Estate Enterprises; Financial Risks; Factor Analysis; Financial Ratios

1. Introduction

Under the dual pressures of China's housing policy adjustments and economic slowdown, the real estate industry is transitioning to high-quality development, yet faces challenges such as tight funding, high leverage ratios, and liquidity pressures. In the Pearl River Delta

region, both developer investments and sales have declined, with frequent default events highlighting increasingly severe financial risks. Based on data from 32 local A-share listed developers in 2023, this study constructs a financial risk early-warning model. Through factor analysis, key risk indicators are extracted from four dimensions: profitability, solvency, operational status, and growth potential, enabling risk classification of real estate companies and proposing targeted countermeasures. The research findings not only provide theoretical support for corporate risk management but also offer empirical evidence for policy formulation, carrying significant theoretical and practical value.

2. Research Methods and Research Content

2.1 Research Methods

This study employs factor analysis to construct a financial risk early-warning model. First, 20 financial indicators were preliminarily screened based on four dimensions: profitability, solvency, operational performance, and growth potential. After two rounds of maximum variance rotation and screening using the psi value and factor loading thresholds, 14 core indicators were retained. Data suitability was validated through KMO test and Bartlett's sphericity test. Four common factors were extracted based on cumulative variance contribution rates, corresponding to profitability, solvency, operational capability, and growth potential. Finally, factor scores were calculated, and the comprehensive risk score was derived by weighting and summing the contribution rates of each factor.

2.2 Research Content

This study screened 32 listed real estate companies in the Pearl River Delta region from the REIS database and developed a financial risk assessment model using factor analysis. After

validating the indicator applicability through KMO and Bartlett tests, common factors were extracted using variance-maximizing rotation. These factors were then interpreted and scored to classify corporate risk levels. By integrating industry-specific characteristics, the research further analyzed the root causes of financial risks and proposed differentiated risk mitigation strategies for companies in different risk zones. The findings provide both theoretical foundations and practical guidance for enhancing financial risk management capabilities in the real estate sector.

3. Financial Risk Assessment Model System

3.1 Indicator System Construction

Building upon financial risk theory, we developed a four-dimensional analytical framework encompassing profitability, solvency, operational capability, and growth potential. For each dimension, we identified five representative factors. Through maximum variance rotation and dimension reduction, we extracted significant common factors. Following variance contribution analysis and iterative validation, we ultimately established 20 key factors as the foundation for subsequent analyses.

Profit: Return on Capital Equity (ROCE), Return on Assets (ROA), Return on Capital Invested (ROCI), Operating Profit Margin (OPM), Return on Shareholders' Equity (ROSE);

Management: Accounts receivable turnover growth rate, inventory turnover rate, accounts payable turnover rate, current assets turnover rate, total assets turnover rate;

Debt repayment: current ratio, quick ratio, net asset-liability ratio, bank cash reserve ratio, long-term capital liability ratio;

Growth: Revenue growth rate, Operating profit growth rate, Total profit growth rate, Net profit growth rate, Total assets growth rate

3.2 Model Testing and Optimization

The KMO test (0.578) and Bartlett's test ($p=0$) confirmed the data suitability and significant correlations among the 14 variables. Principal component analysis extracted four factors, with a cumulative variance contribution rate of 79.3%, constructing a risk framework that encompasses profitability, solvency, operational status, and growth potential.

4. Financial Risk Assessment and Analysis

4.1 Financial Risk Scoring and Classification

The enterprise performance is quantitatively evaluated through four dimensions: profitability, debt repayment capacity, operational capability, and growth potential. These metrics are then weighted and aggregated according to predefined criteria to derive the final composite score F. Detailed data are presented in Table 1.

Table 1. Enterprise Evaluation Results

name	profitability factor	solvency coefficient	combat capability factor	growth factor	multi-stress score	property	ranking
Explanatory rate	30.19%	20.05%	15.27%	13.77%			
weight	38.08%	25.28%	19.27%	17.37%			
Shenzhen Tefa Services	0.5860	3.1787	2.4613	-0.2297	1.4611	state-owned enterprise	1
Shahe Industry	2.2774	-0.0299	0.0208	1.9784	1.2073	state-owned enterprise	2
Zhongnan Shares	-0.1211	-1.0511	4.5093	0.2355	0.5978	state-owned enterprise	3
Hualian Holdings	0.0543	2.6626	-1.1129	-0.3032	0.4268	state-owned enterprise	4
Dajue City	0.0232	-0.3880	-0.5356	3.4326	0.4038	central enterprises	5
Shenzhen Shilianxing	-0.5267	1.5190	0.4890	0.1625	0.3060	state-owned enterprise	6
Yue Xiu Capital	0.1524	1.5211	-0.8821	0.0738	0.2855	state-owned enterprise	7
Shi Rong, Zhao Ye	0.3389	0.4654	-0.3275	0.2983	0.2354	Private enterprises	8
Yue Hongyuan	0.2395	0.5535	-0.5870	0.4940	0.2039	Private enterprises	9
Pearl River development	0.0247	0.5587	-0.4483	0.6272	0.1732	state-owned enterprise	10
Tianjian Group	0.4477	-0.0749	0.2146	-0.2199	0.1547	state-owned enterprise	11
Rongsheng Real Estate	0.4150	-0.7792	-0.0613	0.5779	0.0496	Private enterprises	12
Kinda group	0.2088	-0.0490	-0.1227	-0.2534	-0.0005	Private enterprises	13
Vanke Group	0.2888	-0.3360	0.0167	-0.2308	-0.0118	Private enterprises	14
deep property	0.5246	-0.6114	-0.2629	-0.0590	-0.0157	state-owned enterprise	15
China Merchants Shekou	0.2035	-0.2610	-0.2441	-0.0036	-0.0361	central enterprises	16

Huajin Capital	0.4403	-0.3811	-0.2846	-0.3176	-0.0387	state-owned enterprise	17
Paoli	0.2879	-0.4274	-0.0992	-0.1503	-0.0436	central enterprises	18
Bright Real Estate	0.1680	0.1043	-0.4552	-0.3061	-0.0505	state-owned enterprise	19
Zhuhai Huafa	0.1813	-0.2834	-0.3094	-0.0087	-0.0637	state-owned enterprise	20
Rong'an Real Estate	0.3021	-0.8939	0.3300	-0.1778	-0.0783	Private enterprises	21
OCT	-0.0385	-0.2605	-0.3650	0.3316	-0.0932	state-owned enterprise	22
Xiangjiang Holdings	0.1943	-0.8265	-0.2426	-0.1858	-0.2140	state-owned enterprise	23
Kōyū Group	0.0757	-0.5472	-0.1088	-0.5935	-0.2336	state-owned enterprise	24
Gree Real Estate	-0.0295	-1.0350	-0.1668	0.3796	-0.2391	Private enterprises	25
Financial Street	0.0942	0.2786	-0.4727	-1.8199	-0.3009	central enterprises	26
deep sea industry	-0.0181	-0.5718	-0.3142	-0.8055	-0.3519	state-owned enterprise	27
Huangting International	-0.5887	-1.0153	-0.1673	0.3360	-0.4547	state-owned enterprise	28
Deep cave	-0.5259	0.2035	-0.3889	-1.3481	-0.4579	state-owned enterprise	29
Zhongzhou Investment	-0.1953	-0.7574	0.1881	-2.2778	-0.6253	state-owned enterprise	30
Southern Real Estate	-0.7353	-0.7712	-0.3447	-0.8122	-0.6825	state-owned enterprise	31
The Beauty of Ecology	-4.7494	0.3055	0.0740	1.1756	-1.5128	Private enterprises	32

Through quantile analysis, enterprises are categorized into four risk tiers: Safe Zone ($F \geq 0.23$)-maintaining sound overall financial health but requiring attention to long-term debt structure; Observation Zone ($0.23 > F > -0.04$) – demonstrating growth potential but needing operational efficiency and capital turnover rate improvements; Warning Zone ($-0.04 > F > -0.2375$)-facing insufficient debt repayment capacity and significant leverage pressure; Hazard Zone ($F \leq -0.2375$)-with multiple financial metrics below industry averages, indicating substantial bankruptcy risks and urgent need for comprehensive internal and external reforms.

The comprehensive financial risk stratification analysis shows that the top 9 enterprises are in the low-risk safety zone, the 10th to 18th are in the medium-low risk observation zone, the 19th to 24th are in the medium-high risk warning zone, and the 25th to 32nd are in the high-risk zone facing financial crisis.

4. Conclusion

Based on factor analysis and quantile regression of 2023 financial data from 32 A-share listed real estate companies in the Pearl River Delta, a financial risk early-warning system was constructed. Four core factors (profitability, solvency, operational efficiency, and growth potential) account for 79.28% of total variance. Enterprises were categorized into four risk tiers: Safe Zone (9 companies), Observation Zone (8 companies), Warning Zone (6 companies), and Hazard Zone (8 companies). Different risk tiers exhibited distinct characteristics: Safe Zone companies maintained stable operations but showed weak solvency; Observation Zone

companies like Vanke Group demonstrated growth advantages but lower operational efficiency; Warning Zone companies had solvency below industry averages; Hazard Zone companies such as Gree Real Estate faced comprehensive financial deterioration. Tailored response strategies were proposed for each risk tier. The study also revealed ownership differences: Central SOEs excelled in profitability and solvency but lacked operational efficiency; local SOEs showed sluggish growth; private enterprises, while demonstrating operational vitality, required stronger risk resilience. It is recommended to establish a big data-driven dynamic monitoring system to reduce early-warning response time to within 72 hours.

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