Analysis of the financial performance of listed companies in the real estate sector based on factor analysis

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Abstract

In August 2020, The People's Bank of China(PBOC) and Minstry of Housing and Urban-Rural Development of the People's of China(MOHURD) introduced the "three red lines" policy for the supervision and financing management of the real estate industry, which is a landmark event for the real estate industry. For many years, the main source of funding for real estate companies has been bank loans and real estate pre-receipts, which has led to a very high debt ratio for real estate companies, and while this high leverage has brought great opportunities for real estate companies to develop, it also harbours great risks. The introduction of the "three red lines" policy has prompted a number of companies to reduce their debt and mitigate their financial risks. This paper collects data on the financial indicators of listed real estate enterprises as at 31 December 2020 and uses factor analysis to evaluate their financial performance. The current operating status of real estate listed companies and possible risks are evaluated from a financial perspective, and corresponding suggestions are made from the perspective of improving the financial situation.

Keywords

Financial Performance; Factor Analysis; Chinese Real Estate Market

1 Research Background and Significance

Since China entered the era of socialist market economy, many industries have been developing at a rapid pace, and the real estate industry is no exception. At the same time, the rapid growth of the real estate industry has been accompanied by a number of problems. For example, the increasing price of housing has made it difficult for ordinary people to find a home. At the same time, some speculators in the real estate market have taken advantage of the huge profit potential of real estate to hoard properties and sell them when prices rise, the act also known as "Real Estate Speculation". "Real Estate Speculation" is an undesirable product of the rapid development of the real estate market and has seriously undermined the order of the real estate market.

For the sake of the healthy development of the real estate market, State Council of the PRC issued the Notice of the State Council on Resolutely Curbing Excessive Price Rises in Some Cities on April 17, 2010, referred to as the "New National Ten Articles". In the Circular, it was pointed out that speculative house purchases should be strictly curbed and the trend of excessively rising house prices in some cities should be curbed. The circular also adjusted the down payment ratio for the purchase of housing, for families purchasing their first home with a floor area of 90 square metres or more, the down payment ratio for loans shall not be less than 30%. For families buying a second home, the down payment ratio for loans shall not be less than 50%. For areas with excessively high housing prices, banks should, in accordance with the actual situation, suspend the granting of loans to families purchasing a third home or more. With the release of the "New Article 10", many regions across the country have introduced real estate purchase restrictions one after another to curb speculative purchases and ease the tight real estate supply. With the introduction of relevant housing policies, the real estate market has gradually entered a period of calm after a decade of rapid development.

According to data released on China Real Estate Association (referred to as "CREA"), the real estate industry will still adhere to the main tone of regulation and control of "housing not speculation" in 2020. In the first half of this year, the real estate industry was greatly affected by the epidemic. However, the central and local governments have introduced relevant policies to support the real estate industry, which is rapidly warming up under the support of various preferential policies. With the support of various preferential policies, the real estate industry quickly recovered. According to the Evaluation and Research Report of China's Listed real estate Companies in 2021, the average total assets of listed real estate companies in 2020 reached 157. 789 billion yuan, with a year-on-year growth of 11. 96%. The average income of main business was 27. 496 billion yuan, up 1. 8% year-on-year. Operating profit averaged 5. 247 billion yuan, down 7. 15% year on year. It was also the first time in many years that the operating profit of listed companies in the real estate industry did not rise but fell. On August 20, 2020, the Central bank and the Ministry of Housing and Urban-Rural Development issued the "three red lines" policy for capital supervision and financing management in the real estate industry. This is undoubtedly "a knife hanging over the head" for the listed real estate enterprises with high debt and high leverage for years. Under the constraints of the policy, many listed real estate enterprises have adopted a variety of ways to deleverage. As we all know, the biggest characteristic of real estate enterprises is the high debt ratio, and the capital source of real estate mainly comes from bank loans and pre-sale of houses. This means that real estate enterprises are facing extremely high financial risks. The introduction of the "three red lines" policy has prompted many enterprises to reduce debt and reduce financial risks.

This paper collected the financial index data of real estate listed enterprises on December 31, 2020, and evaluated the financial performance by factor analysis. Evaluates the current business situation of listed real estate companies and the possible risks from a financial perspective, and makes corresponding recommendations for improving the financial situation.

2 National and International Literature

In recent years, with the constant changes of the real estate market and the renewal of real estate policies, many scholars have done a lot of relevant studies on the real estate market and real estate enterprises.

Zhang Yafang (2021) expounds the motivation of asset-light operation mode of real estate industry from the perspective of asset-light operation mode of real estate. She believes that the motivation of asset-light operation in the real estate industry mainly comes from the pressure of internal capital chain and the requirements of external policies. In the research, she pointed out that although many real estate enterprises have adopted the asset-light operation mode, there are still many deficiencies and defects.

Zhang Menglu (2021) analyzes the impact of capital structure on corporate performance from the capital structure of real estate enterprises. Through the use of factor analysis, it is further concluded that when the capital structure of the enterprise is unreasonable, the performance of the enterprise will be affected by it, debt will reduce the performance of the enterprise. Therefore, real estate enterprises should properly control their foreign debts and optimize their debt structure.

Liang Xiujuan et al. (2021) believe that the current financial risks of listed real estate companies mainly come from single financing method, high asset-liability ratio and difficulty in fund recovery. In the study, the data of 116 a-share listed real estate companies were collected for factor analysis. After analysis, the conclusion was drawn that unreasonable capital structure and insufficient profitability lead to financial risks, and the risk should be further resolved through the continuous improvement of national policies and the improvement of their own risk resistance ability.

Chen Ruoqiong et al. (2021) take Vanke as the research object to study the characteristics and existing risks of the debt operation mode of real estate enterprises, and propose corresponding solutions for specific risks. Debt management can bring capital for enterprises, but there are also interest rate change risk, debt repayment risk and credit risk. In order to avoid these risks, some measures can be taken to prevent them, such as optimizing the debt structure and establishing a risk prevention mechanism.

Wu Shuang (2020) analyzed the financial risks brought by diversification of real estate from the perspective of diversification. Taking Zhonghong Stock as the research object, this paper analyzes the motivation, process and situation of its diversified operation, and finds out the reasons for the financial risks of Zhonghong Stock. After analysis, the conclusion is drawn that the motivation of financial risk of Zhonghong Shares mainly comes from unreasonable debt capital structure, unreasonable investment decisions and insufficient liquidity.

Yao Xue (2020) studied the impact of deleveraging on financial performance of real estate enterprises. Taking R enterprise as the case study object, the financial indicators of the enterprise before and after deleveraging are compared, and the contribution of deleveraging to the overall financial performance of the enterprise is analyzed. After comparison, it is found that deleveraging greatly reduces the financial risk of enterprises, protects the interests of creditors, and promotes the sustainable development of enterprises.

In China, there are also many researches on real estate enterprises, most of which take the real estate enterprises in specific regions as the research object, and the research topics include operating efficiency, capital structure, etc. , but there are few researches on financial risks.

Nguyen ThiLy et al. (2021) analyzed the operating efficiency of 12 listed real estate companies in Vietnam. Through the collection of 2018-2020 operating performance, analyze the impact of total asset size and cost of

sales on total revenue and gross margin, and on this basis, forecast the operating performance in 2022.

Alexey et al. (2020) analyzed the relationship between public debt structure and investment activities by taking Listed real estate enterprises in Europe as the research object. The research shows that under the circumstance that the main source of corporate debt, namely bank deposits, is decreasing continuously, if the corporate debt structure is diversified, it can maintain a higher foreign investment rate. Therefore, diversified debt structure can help enterprises seize investment opportunities in time.

Cohen et al. (2020) studied the impact of monetary policy, construction industry environment, economic environment and household income on the performance of European listed real estate companies from a macro perspective. Through the research, it is found that the supply side of European real estate enterprises is greatly affected by the environment of construction industry, while the demand side is affected by monetary policy and household income.

Sautma et al. (2020) collected relevant data of Indonesian real estate listed companies from 2013 to 2018, and analyzed the factors affecting the capital structure of real estate companies on this basis. It is found that corporate profitability, non-debt tax shield and corporate asset collateral value all affect the capital structure.

3 Data

In this study, the financial indicators of 40 listed real estate companies in China on December 31, 2020 were selected as variables. This includes an indicator of a company's ability to repay debt: the liquidity ratio X_1, quick ratio X_2, asset-liability ratio X_3. An indicator of an enterprise's operating capacity: total asset turnover X_4, inventory turnover X_5, accounts receivable turnover X_6

And the index reflecting the profitability of the enterprise: deduct the return on non-net assets X_7, return on total assets X8Main business profit margin X_9, and finally, the index that reflects the development ability of the enterprise: net profit growth rate X_{10}, net asset growth rate X_{11}, growth rate of total assets X_{12}. Here are the specific financial metrics for each listed company:

3.1 Solvency Indicators

Table 1. Solvency indicators

S/N	Company name	Solvency		
		Current ratio	quick ratio	Gearing ratio
1	China Vanke Co., Ltd.	1. 174	0. 414	0. 8128
2	Poly Development Holding Group Co., Ltd.	1. 511	0. 525	0. 7869
3	China Merchants Shekou Industrial Zone Holdings Co.,Ltd	1. 54	0. 574	0. 6563
4	Seazen Holdings Co.,Ltd.	1. 107	0. 39	0. 8473
5	Greenland Holdings Corporation Limited	1. 199	0. 491	0. 8889
6	Shenzhen Overseas Chinese Town Co.,Ltd.	1. 618	0. 529	0. 7583

7	hina World Trade Center Co.,Ltd.	1. 666	1. 642	0. 34
8	Nanjing Gaoke Company Limited	1. 103	0. 402	0. 5674
9	Tibet Urban Development And Investment Co.,Ltd	2. 156	0. 349	0. 7533
10	Chongqing new dazheng propertygroup co.,LTD	2. 637	2. 631	0. 3077
11	Shanghai Wanye Enterprises Co.,Ltd	5. 799	4. 855	0. 1353
12	Shenzhen Sdg Service Co.,Ltd.	3. 575	3. 563	0. 265
13	Shanghai Zhangjiang Hi-tech Park Development Co.,ltd.	1. 128	0. 382	0. 5578
14	Shanghai Lingang Holdings CO.,LTD.	1. 416	0. 258	0. 5783
15	Nacity Property Service Group Co.,ltd.	1. 332	1. 321	0. 5217
16	Rongfeng Holding Group Co.,Ltd.	1. 514	0. 394	0. 6022
17	Lushang Health Industry Development Co.,Ltd.	1. 171	0. 247	0. 894
18	Aoyuan Beauty Valley Technology Co.,Ltd.	1. 627	0. 304	0. 7194
19	China Merchants Property Operation&Service Co.,Ltd.	0. 966	0. 701	0. 491
20	Shenzhen Properties & Resources Development (Group) Ltd.	2. 241	1. 117	0. 6903
21	Shanghai Jinqiao Export Processing Zone Development Co.,Ltd.	1. 119	0. 666	0. 6343
22	Shanghai Lujiazui Finance&Trade Zone Development Co.,Ltd.	1. 007	0. 304	0. 6667
23	Vantone Neo Development Group Co.,ltd.	3. 636	2. 290	0. 3434
24	Gemdale Corporation	1. 409	0. 589	0. 7659
25	Tianjin Guangyu Development Co.,Ltd.	2. 404	0. 368	0. 7948
26	China-singapore Suzhou Industrial Park Development Group Co.,ltd.	2. 120	0. 835	0. 4173
27	Hefei Urban Construction Development Co.,Ltd.	1. 601	0. 398	0. 6784
28	Gree Real Estate Co.,Ltd.	1. 981	0. 275	0. 775
29	Shenzhen Centralcon Investment Holding Co.,Ltd.	1. 802	0. 378	0. 8156
30	SHAHE INDUSTRIAL CO.,Ltd.	1. 690	0. 418	0. 6081
31	Metro Land Corporation LTD.	2. 476	0. 422	0. 8312
32	Huafa Industrial Co.,Ltd.Zhuhai	1. 878	0. 521	0. 8031
33	CCCG Real Estate Corporation Limited	2. 176	0. 530	0. 8704
34	Shanghai Ya Tong Co.,ltd.	1. 350	0. 469	0. 6637
35	Wolong Real Estate Group Co.,Ltd.	1. 472	0. 606	0. 5985
36	Shanghai Shibei Hi-Tech Co.,Ltd.	1. 699	0. 195	0. 5616
37	inke Smart Services Group Co., Ltd.	1. 384	0. 406	0. 8072
38	Sunshine City Group Co.， Ltd	1. 383	0. 525	0. 8318
39	China Union Holdings Ltd.	2. 771	1. 708	0. 4628
40	Paslin digital technology co., ltd.	7. 855	4. 466	0. 1211

3.2 Operational Capability Indicators

Table 2. Operating capacity indicators

S/N	Company name	Operation ability		
		Total asset turnover	Inventory turnover	Accounts receivable turnover X_6
1	China Vanke Co., Ltd.	0. 233	0. 312	167
2	Poly Development Holding Group Co., Ltd.	0. 213	0. 247	113. 1
3	China Merchants Shekou Industrial Zone Holdings Co.,Ltd	0. 191	0. 275	56. 34
4	Seazen Holdings Co.,Ltd.	0. 291	0. 444	327. 3
5	Greenland Holdings Corporation Limited	0. 359	0. 560	4. 669
6	Shenzhen Overseas Chinese Town Co.,Ltd.	0. 196	0. 188	104. 8
7	hina World Trade Center Co.,Ltd.	0. 259	43. 1	7. 186
8	Nanjing Gaoke Company Limited	0. 095	0. 161	4. 249
9	Tibet Urban Development And Investment Co.,Ltd	0. 131	0. 124	32. 79
10	Chongqing new dazheng propertygroup co.,LTD	1. 183	697. 3	7. 706
11	Shanghai Wanye Enterprises Co.,Ltd	0. 124	0. 584	13. 05
12	Shenzhen Sdg Service Co.,Ltd.	1. 399	266. 7	4. 605
13	Shanghai Zhangjiang Hi-tech Park Development Co.,ltd.	0. 027	0. 036	6. 713
14	Shanghai Lingang Holdings CO.,LTD.	0. 099	0. 096	21. 34
15	Nacity Property Service Group Co.,ltd.	0. 840	92. 61	4. 562
16	Rongfeng Holding Group Co.,Ltd.	0. 041	0. 041	8. 715
17	Lushang Health Industry Development Co.,Ltd.	0. 232	0. 238	68. 35
18	Aoyuan Beauty Valley Technology Co.,Ltd.	0. 202	0. 243	9. 197
19	China Merchants Property Operation&Service Co.,Ltd.	0. 527	4. 615	7. 604
20	Shenzhen Properties & Resources Development (Group) Ltd.	0. 357	0. 271	20. 29
21	Shanghai Jinqiao Export Processing Zone Development Co.,Ltd.	0. 132	0. 365	21. 66
22	Shanghai Lujiazui Finance&Trade Zone Development Co.,Ltd.	0. 150	0. 154	24. 75
23	Vantone Neo Development Group Co.,ltd.	0. 113	0. 274	38. 37
24	Gemdale Corporation	0. 228	0. 343	220. 8
25	Tianjin Guangyu Development Co.,Ltd.	0. 273	0. 250	1412
26	China-singapore Suzhou Industrial Park Development Group Co.,ltd.	0. 140	0. 157	4. 972
27	Hefei Urban Construction Development Co.,Ltd.	0. 280	0. 264	63. 65
28	Gree Real Estate Co.,Ltd.	0. 182	0. 181	14. 66
29	Shenzhen Centralcon Investment Holding Co.,Ltd.	0. 239	0. 245	89. 71
30	SHAHE INDUSTRIAL CO.,Ltd.	0. 157	0. 136	531
31	Metro Land Corporation LTD.	0. 185	0. 195	38. 01
32	Huafa Industrial Co.,Ltd.Zhuhai	0. 183	0. 208	750. 6
33	CCCG Real Estate Corporation Limited	0. 167	0. 178	725. 1
34	Shanghai Ya Tong Co.,ltd.	0. 372	0. 573	8. 93
35	Wolong Real Estate Group Co.,Ltd.	0. 293	0. 312	249. 1
36	Shanghai Shibei Hi-Tech Co.,Ltd.	0. 064	0. 064	4. 461
37	inke Smart Services Group Co., Ltd.	0. 250	0. 300	33. 96
38	Sunshine City Group Co., Ltd	0. 249	0. 362	61. 45
39	China Union Holdings Ltd.	0. 235	0. 293	121. 7
40	Paslin digital technology co., ltd.	0. 06	0. 096	552. 3

3.3 Profitability Indicators

Table 3. Profitability indicators

S/N	The name of the company	Profitability		
		Deduct non - roe	Return on total assets	Main business profit margin
1	China Vanke Co., Ltd.	0. 1951	0. 033	0. 2275
2	Poly Development Holding Group Co., Ltd.	0. 1665	0. 0351	0. 2494
3	China Merchants Shekou Industrial Zone Holdings Co.,Ltd	0. 1036	0. 025	0. 217
4	Seazen Holdings Co.,Ltd.	0. 29	0. 0329	0. 196
5	Greenland Holdings Corporation Limited	0. 1778	0. 0166	0. 1185
6	Shenzhen Overseas Chinese Town Co.,Ltd.	0. 1314	0. 0376	0. 3194
7	hina World Trade Center Co.,Ltd.	0. 1024	0. 0692	0. 432
8	Nanjing Gaoke Company Limited	0. 1168	0. 0682	0. 263
9	Tibet Urban Development And Investment Co.,Ltd	0. 0343	0. 0075	0. 2642
10	Chongqing new dazheng propertygroup co.,LTD	0. 1432	0. 1185	0. 2078
11	Shanghai Wanye Enterprises Co.,Ltd	0. 039	0. 0393	0. 4744
12	Shenzhen Sdg Service Co.,Ltd.	0. 2977	0. 1368	0. 2029
13	Shanghai Zhangjiang Hi-tech Park Development Co.,ltd.	0. 187	0. 0593	0. 5347
14	Shanghai Lingang Holdings CO.,LTD.	0. 0792	0. 0409	0. 5153
15	Nacity Property Service Group Co.,ltd.	0. 1384	0. 0863	0. 2137
16	Rongfeng Holding Group Co.,Ltd.	0. 0332	0. 0087	0. 2351
17	Lushang Health Industry Development Co.,Ltd.	0. 1959	0. 0109	0. 1484
18	Aoyuan Beauty Valley Technology Co.,Ltd.	0. 1132	0. 0039	0. 237
19	China Merchants Property Operation&Service Co.,Ltd.	0. 0474	0. 0249	0. 1274
20	Shenzhen Properties & Resources Development (Group) Ltd.	0. 2317	0. 0637	0. 3422
21	Shanghai Jinqiao Export Processing Zone Development Co.,Ltd.	0. 1008	0. 0403	0. 4521
22	Shanghai Lujiazui Finance&Trade Zone Development Co.,Ltd.	0. 2031	0. 052	0. 5503
23	Vantone Neo Development Group Co.,ltd.	0. 0019	0. 0063	0. 3668
24	Gemdale Corporation	0. 1744	0. 0414	0. 26
25	Tianjin Guangyu Development Co.,Ltd.	0. 15	0. 0306	0. 2455
26	China-singapore Suzhou Industrial Park Development Group Co.,ltd.	0. 1213	0. 0662	0. 6273
27	Hefei Urban Construction Development Co.,Ltd.	0. 1723	0. 0471	0. 2722
28	Gree Real Estate Co.,Ltd.	0. 0685	0. 0159	0. 228
29	Shenzhen Centralcon Investment Holding Co.,Ltd.	0. 0353	0. 0036	0. 1861
30	SHAHE INDUSTRIAL CO.,Ltd.	0. 0068	0. 0041	0. 2311
31	Metro Land Corporation LTD.	0. 1283	0. 0222	0. 2317
32	Huafa Industrial Co.,Ltd.Zhuhai	0. 1618	0. 0164	0. 1764
33	CCCG Real Estate Corporation Limited	0. 0073	0. 0122	0. 2276
34	Shanghai Ya Tong Co.,ltd.	0. 0494	0. 0242	0. 1479
35	Wolong Real Estate Group Co.,Ltd.	0. 1634	0. 0623	0. 3659
36	Shanghai Shibei Hi-Tech Co.,Ltd.	0. 0218	0. 0097	0. 4272
37	inke Smart Services Group Co., Ltd.	0. 2042	0. 0276	0. 1975

38	Sunshine City Group Co., Ltd	0. 2065	0. 0166	0. 1555
39	China Union Holdings Ltd.	0. 105	0. 0673	0. 425
40	Paslin digital technology co., ltd.	0. 0082	0. 0294	0. 317

3.4 Growth Capacity Indicators

Table 4. Indicators of growth capacity

S/N	Company name	Growth ability		
		Net profit growth rate	Growth rate of net assets	Growth rate of total assets
1	China Vanke Co., Ltd.	0. 0756	0. 2929	0. 0805
2	Poly Development Holding Group Co., Ltd.	0. 0664	0. 1617	0. 2111
3	China Merchants Shekou Industrial Zone Holdings Co.,Ltd	0. 1031	0. 1143	0. 1934
4	Seazen Holdings Co.,Ltd.	0. 2352	0. 3262	0. 1637
5	Greenland Holdings Corporation Limited	0. 0089	0. 1818	0. 2196
6	Shenzhen Overseas Chinese Town Co.,Ltd.	0. 0963	0. 1619	0. 2028
7	hina World Trade Center Co.,Ltd.	0. 151	0. 0585	0. 0244
8	Nanjing Gaoke Company Limited	0. 1224	0. 12	0. 1216
9	Tibet Urban Development And Investment Co.,Ltd	0. 0004	0. 029	0. 0423
10	Chongqing new dazheng propertygroup co.,LTD	0. 2558	0. 1302	0. 2383
11	Shanghai Wanye Enterprises Co.,Ltd	0. 486	0. 063	0. 0588
12	Shenzhen Sdg Service Co.,Ltd.	0. 6025	2. 0236	1. 2694
13	Shanghai Zhangjiang Hi-tech Park Development Co.,ltd.	2. 2603	0. 1076	0. 2812
14	Shanghai Lingang Holdings CO.,LTD.	0. 101	0. 085	0. 1067
15	Nacity Property Service Group Co.,ltd.	0. 2081	0. 1448	0. 0903
16	Rongfeng Holding Group Co.,Ltd.	1. 5519	0. 053	0. 0347
17	Lushang Health Industry Development Co.,Ltd.	0. 6211	0. 388	0. 0978
18	Aoyuan Beauty Valley Technology Co.,Ltd.	0. 692	0. 0022	0. 074
19	China Merchants Property Operation&Service Co.,Ltd.	0. 5153	0. 0358	0. 0135
20	Shenzhen Properties & Resources Development (Group) Ltd.	0. 0145	0. 1575	0. 1332
21	Shanghai Jinqiao Export Processing Zone Development Co.,Ltd.	0. 0185	0. 0815	0. 2205
22	Shanghai Lujiazui Finance&Trade Zone Development Co.,Ltd.	0. 0091	0. 1625	0. 1084
23	Vantone Neo Development Group Co.,ltd.	0. 8773	0. 0727	0. 0799
24	Gemdale Corporation	0. 0145	0. 1417	0. 1996
25	Tianjin Guangyu Development Co.,Ltd.	0. 2961	0. 1283	0. 0704
26	China-singapore Suzhou Industrial Park Development Group Co.,ltd.	0. 0481	0. 0897	0. 1131
27	Hefei Urban Construction Development Co.,Ltd.	0. 7362	1. 4166	0. 1788
28	Gree Real Estate Co.,Ltd.	0. 0593	0. 0721	0. 1472
29	Shenzhen Centralcon Investment Holding Co.,Ltd.	0. 7625	0. 023	0. 0155
30	SHAHE INDUSTRIAL CO.,Ltd.	0. 7157	0. 0022	0. 2339
31	Metro Land Corporation LTD.	1. 3104	1. 0334	0. 0783
32	Huafa Industrial Co.,Ltd.Zhuhai	0. 375	0. 4631	0. 3747
33	CCCG Real Estate Corporation Limited	0. 2014	1. 0592	1. 0951
34	Shanghai Ya Tong Co.,ltd.	0. 4663	0. 0816	0. 0946
35	Wolong Real Estate Group Co.,Ltd.	0. 0514	0. 1427	0. 0225

36	Shanghai Shibei Hi-Tech Co.,Ltd.	0. 3212	0. 1098	0. 0492
37	inke Smart Services Group Co., Ltd.	0. 5266	0. 4093	0. 1852
38	Sunshine City Group Co., Ltd	0. 2707	0. 1642	0. 1455
39	China Union Holdings Ltd.	0. 1325	0. 0318	0. 1069
40	Paslin digital technology co., ltd.	0. 0818	0. 0354	0. 0077

4 Analysis Process

4.1 Data Standardisation

In this data analysis, the original variables, namely, various financial indicators, are different in quantity and units of measurement. In order to make the variables more comparable, the variables need to be standardized first. Z-score method was used to standardize variable data in SPSS26. The following figure shows the standardized data of some listed companies:

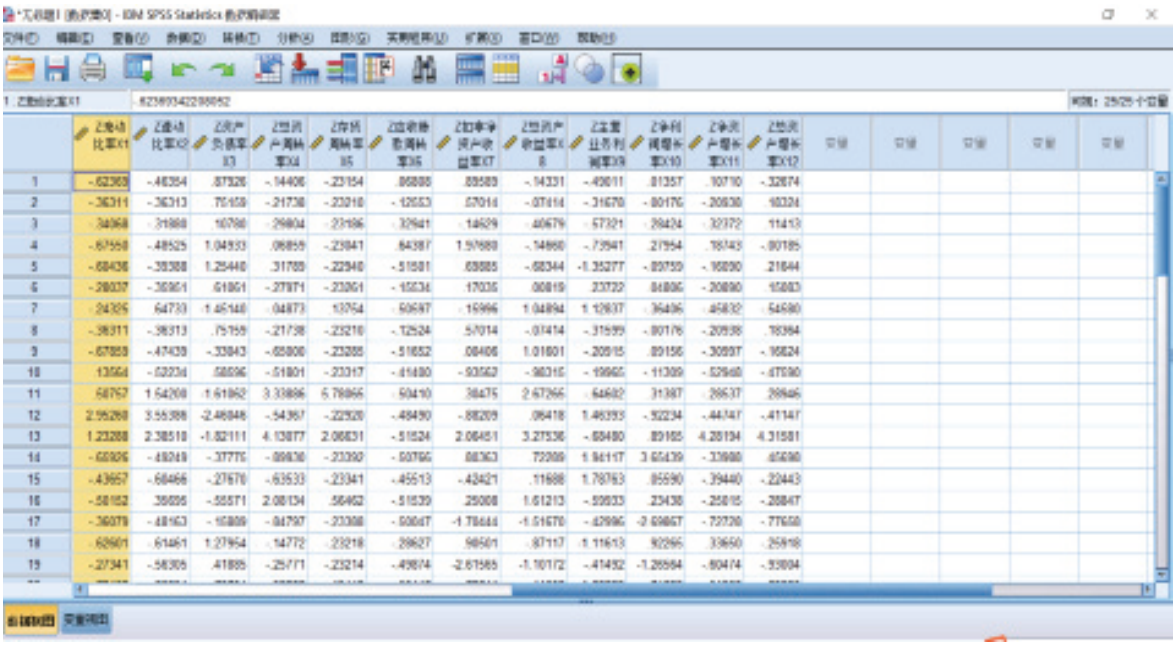


Figure 1. Data standards results

4.2 Determine If the Original Variables are Suitable for Factor Analysis

SPSS26 software was used to test the financial data of 40 listed companies. In this process, Bartlett Test of Sphericity and KMO(Kaiser- Meyer- Olkin) are used. Here's what the data says:

KMO 和巴特利特检验

KMO 取样适切性量数。		.556
巴特利特球形度检验	近似卡方	371.465
	自由度	66
	显著性	.000

Figure 2. Results of KMO and Bartlett tests

As shown in Figure 2., according to the results of KMO and Bartlett Test of Sphericity, KMO value is 0. 556, greater than the critical value of 0. 5. The significance of Bartlett's sphericity test was 0, less than the significance level value of 0. 05. Therefore, the data has a certain correlation, in line with the basic conditions of carrying out factor analysis.

4.3 Constructing Factor Variables and Determining the Number of Common Factors

After checking the raw data, we need to further determine the number of common factors. In SPSS software, principal component method is used to determine the number of common factors. In general, as long as the initial eigenvalue >1 can be used as a common factor.

总方差解释

	初始特征值			提取载荷平方和			旋转载荷平方和		
成分	总计	方差百分比	累积 %	总计	方差百分比	累积 %	总计	方差百分比	累积 %
1	3.818	31.820	31.820	3.818	31.820	31.820	2.917	24.304	24.304
2	2.863	23.858	55.678	2.863	23.858	55.678	2.489	20.738	45.042
3	1.581	13.174	68.852	1.581	13.174	68.852	2.473	20.612	65.654
4	1.264	10.529	79.381	1.264	10.529	79.381	1.647	13.727	79.381
5	.759	6.322	85.703						
6	.690	5.747	91.450						
7	.437	3.642	95.092						
8	.226	1.887	96.979						
9	.201	1.674	98.653						
10	.076	.630	99.283						
11	.062	.513	99.796						
12	.024	.204	100.000						

Figure 3. Total variance interpretation

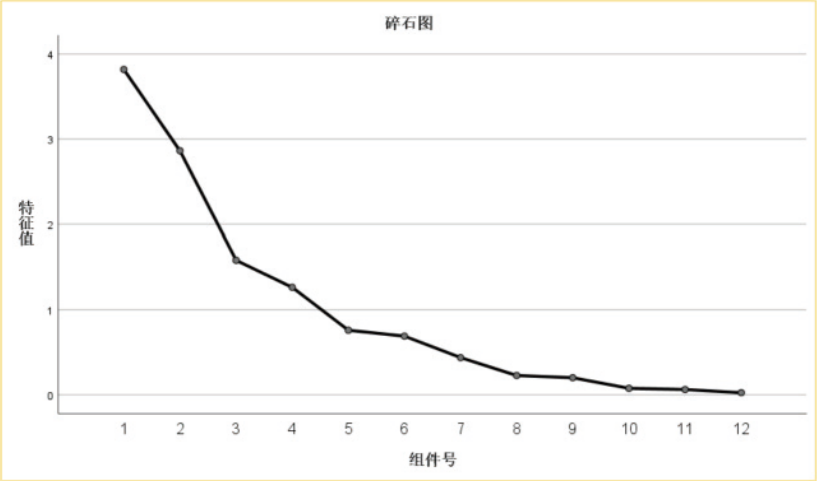


Figure 4. Lithotripsy diagram

According to the total variance interpretation and stone figure, the initial eigenvalues of factors 1-4 are all greater than 1, and the cumulative variance contribution rate is close to 80%. It shows that the extracted four common factors can better represent the whole data. Therefore, four common factors are selected in this study.

4.4 Using Rotation to Make Factor Variables Interpretable

In the previous step, the number of common factors was determined. So the next step is to explain the common factors again, so that we can use the common factors to score financial performance. In this step, SPSS26 is used to carry out orthogonal rotation of the common factors, so as to facilitate the interpretation and naming of the common factors through the commonness of financial indicators.

旋转后的成分矩阵[a]

	成分			
	1	2	3	4
Zscore(速动比率X2)	.909			
Zscore(资产负债率X3)	-.892			
Zscore(流动比率X1)	.881			
Zscore(净利润增长率X10)		.794		
Zscore(扣非净资产收益率X7)		.790		
Zscore(净资产增长率X11)		.645		.512
Zscore(总资产收益率X8)		.591	.545	
Zscore(总资产周转率X4（次）)			.914	
Zscore(存货周转率X5（次）)			.860	
Zscore(应收账款周转率X6（次）)				.728
Zscore(总资产增长率X12)		.537		.573
Zscore(主营业务利润率X9)				-.524

提取方法：主成分分析法。
旋转方法：凯撒正态化最大方差法。
a. 旋转在 7 次迭代后已收敛。

Figure 5. Component matrix after rotation

According to the rotated component matrix, factor 1 has a high factor load in quick ratio and flow ratio,

which are 0. 909 and 0. 881 respectively. Therefore, factor 1 can explain solvency and is named solvency factor. Factor 2 has a high factor load on the growth rate of net profit, return on non-net assets, return on total assets and growth rate of net assets, which are 0. 794, 0. 79, 0. 59 and 0. 645 respectively. Therefore, factor 2 can explain profitability and is named profitability factor. Factor 3 has a high factor load on total asset turnover and inventory turnover, which is 0. 914 and 0. 860, respectively. Therefore, factor 3 can reflect operating capacity and is named as operating capacity factor. Factor 4 has a high factor load on accounts receivable turnover, net asset growth rate and total asset growth rate, which are 0. 728, 0. 512 and 0. 573, respectively. Therefore, factor 4 can reflect the growth capacity of an enterprise and is named growth capacity factor.

4.5 Calculate the Factor Scores

成分得分系数矩阵

	成分			
	1	2	3	4
Zscore(流动比率X1)	.342	-.041	-.107	.226
Zscore(速动比率X2)	.309	-.031	.033	.083
Zscore(资产负债率X3)	-.290	.027	-.028	.132
Zscore(总资产周转率X4（次）)	-.057	-.053	.408	-.004
Zscore(存货周转率X5（次）)	-.030	-.127	.417	-.097
Zscore(总资产收益率X8)	.092	.202	.126	-.193
Zscore(应收账款周转率X6（次）)	.085	-.012	-.146	.471
Zscore(主营业务利润率X9)	.234	.253	-.340	-.281
Zscore(扣非净资产收益率X7)	-.056	.342	-.050	-.050
Zscore(总资产增长率X12)	.046	.185	.009	.329
Zscore(净资产增长率X11)	.040	.248	-.031	.288
Zscore(净利润增长率X10)	.004	.395	-.166	-.083

提取方法：主成分分析法。
旋转方法：凯撒正态化最大方差法。
组件得分。

Figure 6. Component score coefficient matrix

According to the matrix of component score coefficients in Figure 4-6, an expression for the common factor can be obtained. :

F_1=0. 342X_1+0. 309X_2-0. 290X_3-0. 057X_4-0. 030X_5+0. 085X_6-0. 056X_7+0. 092X_8+0. 234X_9+0. 004X_{10}+0. 040X_{11}+0. 46X_{12}

F_2=-0. 041X_1-0. 031X_2+0. 027X_3-0. 053X_4-0. 127X_5-0. 012X_6+0. 342X_7+0. 202X_8+0. 253X_9+0. 395X_{10}+0. 248X_{11}+0. 185X_{12}

F_3=-0. 107X_1+0. 33X_2-0. 028X_3+0. 408X_4+0. 417X_5-0. 146X_6-0. 050X_7+0. 126X_8-0. 340X_9-0. 166X_{10}-0. 031X_{11}+0. 009X_{12}

F_4=0. 226X_1+0. 083X_2+0. 132X_3-0. 004X_4-0. 097X_5+0. 471X_6-0. 050X_7-0. 193X_8-0. 281X_9-0. 083X_{10}+0. 288X_{11}+0. 329X_{12}

The above is the expression of the score of each common factor, but since it is difficult to make a comprehensive evaluation by a single common factor, therefore the composite score is calculated by using the proportion of the variance contribution of each common factor as a weight number:

F=0. 306F_1+0. 261F_2+0. 260F_3+0. 173F_4

The score of each common factor and the comprehensive score were calculated and sorted in SPSS:

Table 5. Combined factor score ranking

S/N	Company name	F1	F2	F3	F4	Composite scores
1	Shenzhen Sdg Service Co.,Ltd.	1. 74795	2. 76088	2. 9181	1. 81363	2. 33
2	Chongqing new dazheng propertygroup co.,LTD	0. 79472	0. 42558	4. 38693	1. 1427	1. 08
3	Changchun jingkai (Group) co., ltd.	3. 4921	1. 00375	0. 97336	1. 29847	0. 78
4	Shanghai Wanye Enterprises Co.,Ltd	3. 1778	0. 70354	0. 66135	0. 13324	0. 59
5	CCCG Real Estate Corporation Limited	0. 06954	0. 32586	0. 44693	3. 31478	0. 52
6	Hefei Urban Construction Development Co.,Ltd.	0. 24899	1. 46206	0. 2488	0. 48412	0. 32
7	Nacity Property Service Group Co.,ltd	0. 10737	0. 05661	1. 60155	0. 80421	0. 26
8	Huafa Industrial Co.,Ltd.Zhuhai	0. 41345	0. 35206	0. 47461	1. 84031	0. 16
9	Tianjin Guangyu Development Co.,Ltd.	0. 03443	0. 38191	0. 65296	2. 26619	0. 11
10	Metro Land Corporation LTD.	0. 39162	1. 13088	0. 57395	0. 49462	0. 11
11	Shenzhen Properties & Resources Development (Group) Ltd.	0. 08226	0. 61076	0. 00355	0. 54065	0. 09
12	Shanghai Zhangjiang Hi-tech Park Development Co.,ltd	0. 2428	2. 46915	1. 52767	1. 43041	0. 07
13	hina World Trade Center Co.,Ltd.	0. 81844	0. 0264	0. 02514	1. 23714	0. 05
14	China Union Holdings Ltd.	0. 95849	0. 06316	0. 32968	0. 89268	0. 04
15	China-singapore Suzhou Industrial Park Development Group Co.,ltd.	0. 99797	0. 77215	0. 98197	1. 4521	0
16	Wolong Real Estate Group Co.,Ltd.	0. 91614	0. 70463	0. 05191	0. 43833	0. 03
17	Wolong Real Estate Group Co.,Ltd.	0. 01171	0. 29933	0. 17382	0. 53752	0. 06
18	Jinkeproperty Group Co.,Ltd.	0. 8072	0. 60125	0. 04105	0. 09005	0. 09
19	Gemdale Corporation	0. 47891	0. 1811	0. 08615	0. 0959	0. 11
20	Poly Development Holding Group Co., Ltd.	0. 55861	0. 16984	0. 08279	0. 02617	0. 14
21	Vantone Neo Development Group Co.,ltd.	1. 28375	1. 55222	0. 32936	0. 2735	0. 15
22	Shenzhen Overseas Chinese Town Co.,Ltd.	0. 32934	0. 19969	0. 27551	0. 15336	0. 15
23	Nanjing Gaoke Company Limited	0. 2583	0. 18595	0. 02859	0. 74449	0. 17
24	China Vanke Co., Ltd.	0. 77944	0. 22459	0. 04231	0. 03458	0. 18
25	Shanghai Lujiazui Finance&Trade Zone Development Co.,Ltd.	0. 02957	0. 93707	0. 82769	1. 22567	0. 19
26	Shanghai Jinqiao Export Processing Zone Development Co.,Ltd.	0. 0102	0. 28873	0. 56508	0. 76793	0. 2
27	China Merchants Shekou Industrial Zone Holdings CO.,Ltd.	0. 42294	0. 37276	0. 0624	0. 00627	0. 21

28	Sunshine City Group Co., Ltd	0. 94587	0. 10817	0. 09771	0. 13758	0. 21
29	China Merchants Property Operation&Service Co.,Ltd.	0. 56077	0. 63533	0. 78045	0. 46996	0. 22
30	Greenland Holdings Corporation Limited	1. 16312	0. 19055	0. 48878	0. 2848	0. 23
31	Lushang Health Industry Development Co.,ltd.	1. 17142	0. 37076	0. 04515	0. 23583	0. 23
32	Shanghai Ya Tong Co.,ltd.	0. 67909	0. 46683	0. 42534	0. 16472	0. 25
33	Shanghai Lingang Holdings CO.,LTD.	0. 17469	0. 31042	0. 8269	1. 07036	0. 27
34	SHAHE INDUSTRIAL CO.,Ltd.	0. 18102	1. 37709	0. 12989	1. 00138	0. 28
35	Gree Real Estate Co.,Ltd.	0. 56685	0. 48631	0. 08247	0. 00242	0. 32
36	Tibet Urban Development and Investment Co.,Ltd.	0. 41268	0. 74512	0. 27466	0. 11289	0. 41
37	Shanghai Shibei Hi-Tech Co.,Ltd.	0. 02626	0. 6031	0. 64008	0. 63578	0. 43
38	Shenzhen Centralcon Investment Holding Co.,Ltd.	0. 76517	1. 47476	0. 28246	0. 18822	0. 51
39	Aoyuan Beauty Valley Technology Co.,Ltd.	0. 53474	1. 95449	0. 22333	0. 17925	0. 65
40	Rongfeng Holding Group Co.,Ltd.	0. 43375	2. 2814	0. 16144	0. 09384	0. 7

5 Description of Results

After processing and analyzing the original data with a series of tools of SPSS, the comprehensive ranking of 41 listed real estate enterprises was obtained. Through comprehensive ranking, we can also better evaluate the financial performance of real estate enterprises. At the same time, the comprehensive score is compared with the individual financial indicators of the enterprise to find out the financial indicators related to the comprehensive score. As shown in Table 5. , in terms of comprehensive score ranking, the top five are Shenzhen SDG Service Co. , Ltd. , Chongqing new Dazheng Property Group co. , Paslin digital technology co. , ltd. , Shanghai Wanye Enterprises Co. ,Ltd, and CCCG Real Estate Corporation Limited. Through further comparison of relevant financial indicators, the top enterprises have obvious advantages in terms of solvency. Among them, the asset-liability ratio of Tefa Service is 26. 5%, that of New Dazheng is 30. 77%, that of Changchun Economic Development is 12. 11%, and that of Wanye Enterprise is 13. 53%. For these four enterprises, their asset-liability ratio is kept at a low level, which means that the debts of these four enterprises are relatively small, and their solvency is relatively guaranteed. From the situation of these four enterprises, asset-liability ratio has a higher contribution to its comprehensive ranking.

However, CCCG Real Estate Corporation Limited, ranked fifth, had a debt-to-asset ratio of 87. 04%, which was the highest among the top five enterprises and extremely high compared with the other 40 enterprises. So, why can China Real Estate in such a high asset-liability ratio, maintain the overall ranking of the fifth? Through the further comparison of financial indicators, it is found that CCCG Real Estate Corporation Limited has maintained a high level in the accounts receivable turnover rate, and its accounts receivable turnover rate has maintained at the frequency of 725. 1. This means that China Communications Real Estate can guarantee the rapid recovery of payment for goods during sales, and the fast recovery of payment for goods means sufficient working capital, which can further guarantee the development of the enterprise. In order to further compare the receivables turnover rate with the comprehensive ranking, I sorted the accounts receivable turnover rate and found that the accounts receivable turnover rate of Tianjin Guangyu Development Co. reached 1412 times, ranking first among 41 enterprises in the accounts receivable turnover rate, while Tianjin Guangyu Development Co. ranked ninth in the factor comprehensive score. Zhuhai Huafa Properties Co. ,Ltd

ranked second in the accounts receivable turnover rate, which was 750. 6 times, and Zhuhai Huafa Properties Co. ,Ltd ranked eighth in factor comprehensive score. Therefore, after comparing the accounts receivable turnover rate with the factor comprehensive score ranking, it is not difficult to draw the conclusion that the accounts receivable turnover rate also has a greater contribution to the factor comprehensive score.

And some other real estate industry leading enterprises, in the above factor score situation is not particularly superior. Vanke ranked 24th, with a composite score of -0. 18. Its asset-liability ratio is as high as 81. 28%, and the accounts receivable turnover rate is only 167 times. Because the performance of these two decisive indicators is not very ideal, resulting in the comprehensive score of Wanke is also low. This also exposed vanke as a real estate leading enterprise, the existence of debt repayment pressure.

6 Conclusions and Recommendations

To sum up, the key factor restricting the financial performance of real estate enterprises is debt paying ability. The biggest characteristic of enterprises in China's real estate industry is high debt ratio. For real estate enterprises, high leverage has always been the development mode of such enterprises. Due to the particularity of the real estate industry, its project development often needs a large sum of funds, from the cost of land auction to the construction of real estate and the construction of supporting facilities are a large sum of costs, such a high amount of funds for most real estate enterprises is difficult to bear, can only turn to banks for financing. Therefore, real estate enterprises generally need to borrow money from banks as project start-up funds at the initial stage of the project. In the past few years, when the real estate industry was developing rapidly, most real estate enterprises kept borrowing in order to speed up the expansion, making the debt ratio of enterprises higher and higher. Through the collection of financial indicators of the real estate industry, it is found that the asset-liability ratio of most enterprises remains above 70%. However, such a high debt ratio does not necessarily bring high rates of return, and may even bring risks to enterprises. The main income of real estate industry comes from real estate development income and property management income. Generally speaking, it takes a long time from the development of real estate to the sale of real estate, which also means that it takes a long time for real estate enterprises to obtain substantial income. Once the real estate cannot be sold smoothly, the enterprise will not be able to obtain income in time, let alone repay the corresponding loans, and will easily fall into financial risks.

Therefore, for the real estate industry, controlling the debt ratio is the key to long-term development. After several years of rapid growth, the real estate industry is gradually easing off. At present, changes in the market environment and regulatory environment determine that the real estate industry is no longer suitable for the development mode of high leverage. As mentioned above, if the real estate enterprise cannot realize the income of real estate development in time, it will be unable to repay the foreign debt in time, and even more seriously, it will lead to the fracture of capital chain. Many companies borrowed heavily to expand during the boom in the real estate market a few years ago. Years have passed, and the period of rapid development of the real estate industry has passed. Compared with previous years, the market demand for real estate has decreased, but the debt pressure inside enterprises has increased instead of decreased. In the face of such a relatively flat demand market, it is difficult for real estate enterprises to guarantee the repayment of foreign debts and obtain high returns from them. In this case, enterprises will face increasing debt repayment pressure. Therefore, high leverage has become a key factor restricting the development of real estate enterprises.

For a long time in the future, the development strategy of real estate enterprises should take reducing the debt ratio as the main goal.

As a real estate enterprise not only to control the debt ratio, but also to strengthen the management of accounts receivable. Through a series of data analysis above, it can be concluded that account turnover rate has a certain impact on the comprehensive score of financial indicators, so enterprises should also carry out reasonable control of accounts receivable. Some real estate enterprises in order to expand their sales, will often take the way of first sales after collection. However, the subsequent recovery of accounts receivable is not well managed, resulting in many bad debts. Businesses are unable to receive sales money, not only to launch new projects, but also to pay off debts on time. Therefore, accounts receivable management is also a link that real estate enterprises should pay attention to. For accounts receivable management, a risk assessment mechanism can be set up in the pre-sales link to comprehensively assess the customer's credit rating and give customers certain preferences according to the credit rating. Special management departments should be set up in the after-sales link to follow up the receivables, and corresponding measures should be taken in time for the receivables that may not be able to be recovered, so as to avoid the situation of capital chain fracture due to the failure to recover funds in time.

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