

# Empirical analysis of ecological and financial risks of real estate enterprises based on the data of 12 enterprises from 2016 to 2020

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**Abstract.** The domestic real estate industry is opening up other fields or upgrading and improving its business due to the epidemic and policies in 2020. Therefore, the Real estate's business ecology and financial analysis are studied to explore the new profit growth windfall. This paper uses SWOT analysis and the F-score model as the primary analysis methods. The former is to qualitatively analyze the strategic changes in the external business ecology and internal ecology of twelve companies and the impact of their financial indicators; The latter F-score model quantifies and stratifies the risk level of companies, identifies the deep-seated causes, and gives the solution design of optimization measures to reveal its financial effects. Finally, the following research results are obtained. (1) The analysis of relevant quantitative indicators and business ecology shows that different companies continue to tap innovation outlets to deal with the "cold wave" of real estate, so as to reduce the debt repayment pressure, find their own growth potential, and stabilize the asset structure. (2) However, some companies lag behind their peers in product diversification and value-added capabilities, resulting in weaker solvency. (3) High turnover brings fragile resilience and unstable product performance, but it effectively improves the company's operational capability.

**Keywords:** business ecology, financial risk, Real estate, F-score model.

## 1. Introduction

While the domestic real estate market has tightened its policies and experienced an overall decline, different companies show different market performance. Their business ecology and financial performance are worthy of learning from other companies in the market. In this paper, we analyze the business ecology of twelve companies and evaluate the company's financial data.

Based on the financial statements of 12 companies in recent five years, this paper qualitatively analyze the strategic changes of their external business ecological environment and internal ecological environment by SWOT analysis, and analyzes financial statements, financial indicators and comparative analysis of the same industry by F-score model, so as to help the healthy development of the real estate industry.

(1) Country Garden, which manages to achieve leading sales and actively introduced light assets to transform the real estate industry despite being hit hard by the epidemic, is the subject of this study.

(2) Unlike other studies that simply analyze the financial performance of real estate, this paper considers the impact of business ecology on corporate operations and uses swot analysis to analyze the external business ecology of the enterprise. It proves the inevitability of cause and effect of internal business ecology-related points. Through the F-score model, we analyze the internal operation of their corporate development path in the past five years.

(3) This paper analyzes the similarities and differences between twelve companies in the same industry to observe market performance better.

This paper will present the research results through article viewpoints, business ecology analysis, financial risk analysis and conclusions.

## 2. Review of the literature

### 2.1 Internal and external ecology of company management

In modern companies, where ownership and control are separated, management has control of the company and has a decisive influence on corporate behavior. [1] Numerous studies have found that differences in management competencies lead to large variability in their behavioral choices affecting the company's decision-making behavior and performance level. The level of corporate decision-making, profitability, financing ability, and operating ability fall within corporate internal controls.[2] Because of the limitations of the inner ecology of a company's operations, this paper refines the results of the financial risk analysis by combining the internal and external operating ecology.

In China, Xi Youmin (2001) regarded the development of enterprises as the sum of their own management and their adaptation to external business ecology. The adaptation to external is divided into adaptation to hard and soft environments. He divided the research framework of the external environment into six dimensions.[3] The combined analysis of internal and external ecology can predict financial risks more comprehensively. The need for a joint internal and external operating ecology analysis is better highlighted.

### 2.2 Analysis of the company's financial risks

The common methods of analyzing the company's financial risk are mainly financial statement analysis, indicator analysis and empirical analysis. It is applied by comparing the actual and standard values of the main financial indicators of an enterprise. The advantage of the financial statement analysis method is that the analysis is more comprehensive, and the disadvantage is that the analysis may be different. The indicator analysis method finds and identifies financial risks by calculating and comparing the values of financial risk-related indicators. The advantage is that the data reference is convenient, and the disadvantage is that the data is not real-time. The empirical analysis method relies on the experience and competence of experts to carry out financial risk analysis and identification.[4] The advantage of it is that the analysis can be made in the absence of information, and the disadvantage is that it is subjective.

Research on the evaluation of financial risks of enterprises has also been strengthened by many scholars abroad who have conducted a theoretical analysis of the relevant aspects.[5] In recent years, most scholars have focused on studying risk evaluation methods and the construction of evaluation models.

YuCao (2012) constructed a system of evaluation indicators.[6] It was found to have better accuracy and stability than other evaluation methods.

JaeJoon Ahn and HyunWoo Byun (2013) constructed a model for evaluating financial risk using five years of financial data of real estate companies in Korea, using ridge regression and other methods.[7]

CenapIlter (2016) used a multivariate linear judgment model to specifically analyze the financial situation of corporate bankruptcy as a way to determine the content of financial risk indicators that lead to corporate bankruptcy.[8]

Chen and Tian (2017) analyzed the key financial indicators of 33 listed companies through factor analysis [9]. They proved that the results of factor analysis and cluster analysis showed the same performance as the actual market performance of the sample.

### 2.3 Literature Review

This paper connects internal and external business ecology through swot analysis and financial index analysis. The F-score model is used to analyze the internal operation. A combination of qualitative and quantitative analysis methods is used to achieve the purpose of a complete analysis system that is complementary and mutually beneficial, and improve all aspects of financial risk analysis and prediction.

### 3. Analysis of the business ecology

#### 3.1 The internal ecology

The business revenue of the Country Garden is mainly derived from two operating segments: real estate development and construction. The main business of Country Garden is diversified, and the trend of extending the industrial chain is apparent. All in all, Country Garden is at the forefront of the transformation module of the service industry to modernization. The corporate development strategy also attaches importance to the application of new technologies and the development of new products, and has a greater advantage in intelligent community family services.

#### 3.2 The external ecology

This section analyzes Country Garden's strategic changes through swot analysis, so as to understand how to give full play to its advantages, overcomes its disadvantages, and wisely use opportunities to deal with threats, and deepen the understanding of Country Garden by strategic changes, thus affecting its profit model.

Table 1. Enterprise SWOT analysis

|               |                                             |                                                                                                                                                                                                                   |
|---------------|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Strengths     | Strategic Innovation                        | Develop modern agriculture and robotics service technology, occupy the market, and give profitability model to the uniqueness.                                                                                    |
|               | Sales Channel Advantage                     | Using cloud technology to build the online and offline national direct house purchase platform.                                                                                                                   |
|               | Good brand reputation                       | Using modern agricultural technology to participate in precise poverty alleviation. It creates a good corporate reputation.                                                                                       |
| Weaknesses    | Slow pace of innovation in operating models | The development of the real estate industry was hit by the epidemic in 2020, while the immaturity of Country Garden's innovative transformation also affected the continued stable operation of its profit model. |
|               | Market Positioning                          | Because its market is located in third-and fourth-tier cities, its gross profit margin is lower than that of its competitors.                                                                                     |
| Opportunity   | Domestic Market                             | Evergrande Group had a series of difficulties, such as the suspension of property projects due to excessive debt operation. Its domestic market shares were taken away by Country Garden.                         |
|               | Overseas Markets                            | By the end of 2020, Country Garden led its competitors in the Southeast Asian property development market regarding investment volume.                                                                            |
| The Challenge | The perpetual nature of competition         | Each property developer tries to find ways to cannibalize the share of friendly companies.                                                                                                                        |
|               | Structure adjustment difficulties           | Country Garden implements organizational structure optimization reform, more intense competition among corporate employees, and a tighter management atmosphere.                                                  |

### 4. Analysis of the current state of financial risk of Country Garden

#### 4.1 Analysis Based on Financing Sources

##### 4.1.1. Debt size and structure

At present, Country Garden's debt ratio fluctuates around 82% in the past five years, which is higher than Sunac's in four years. From the annual report, we know that the ratio of bank and other borrowings to total current liabilities is over 17%. Country Garden has the most stable number of debt fluctuations and fluctuation ratio among the three. Country Garden's current liabilities have a

higher proportion of total liabilities, having been close to 90%. However, all of them have declined after 2018, and the risks embedded in them are decreasing, with the pressure on short-term liabilities from the bank and other borrowings gradually decreasing.[10] Since 2017, Country Garden has started a larger expansion and real estate development. Therefore, it needs a large amount of capital investment and introduces more external capital.

#### 4.1.2. Analysis of solvency

The equity ratio can reflect how a company borrows to operate from the side. [11] Country Garden's costs gradually decrease as a percentage of total assets, and its financial structure stabilizes. At the same time, its gearing ratio has been growing at a faster rate in the past three years, which is closely related to its massive and aggressive expansion since 2017.

### 4.2 Measuring and Evaluating Financial Risk in Country Garden

#### 4.2.1. Financial risk measurement based on the F-score model

In this section, we use the F-score model to analyze the five indicators, which can reflect the company's financial risk from the perspective of debt service, earnings, operations and cash flow, and make financial risk forecasts.

$$F = -0.1774 + 1.1091X_1 + 0.1074X_2 + 1.9272X_3 + 0.0302X_4 + 0.4961X_5 \quad (1)$$

Table 2. Meaning of each variable in the F-score model

| Alphabet | Representative Meaning                                                                                                                    |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------|
| X1       | Liquidity level and solvency of corporate assets                                                                                          |
| X2       | Corporate accumulated but retained earnings, reflecting cumulative corporate earnings                                                     |
| X3       | Cash flow variables, which measure the ability of a business to generate all of its cash flows to service its debt                        |
| X4       | Reflects the basic financial structure of the enterprise. That is, the ratio of shareholders' equity capital to creditors' supply capital |
| X5       | Ability of total assets to generate cash flow                                                                                             |

Based on the above formula, the five indicators of Country Garden are calculated, and the article will compare them with Sunac and Vanke, respectively, to quantitatively analyze the financial risk of Country Garden.

Table 3. X1-X5 specific values

| x1 | Year | Country Garden | Sunac  | Vanke  |
|----|------|----------------|--------|--------|
|    | 2016 | 0.1344         | 0.2869 | 0.1703 |
|    | 2017 | 0.0937         | 0.1828 | 0.1461 |
|    | 2018 | 0.1236         | 0.1363 | 0.1230 |
|    | 2019 | 0.1220         | 0.1081 | 0.0962 |
|    | 2020 | 0.1107         | 0.1144 | 0.1133 |
| x2 | 2016 | 0.0195         | 0.0085 | 0.0253 |
|    | 2017 | 0.0248         | 0.0177 | 0.0241 |
|    | 2018 | 0.0212         | 0.0231 | 0.0221 |
|    | 2019 | 0.0207         | 0.0271 | 0.0225 |
|    | 2020 | 0.0174         | 0.0322 | 0.0222 |
| X3 | 2016 | 0.2893         | 0.1170 | 0.3976 |
|    | 2017 | 0.3458         | 0.2420 | 0.3676 |
|    | 2018 | 0.2939         | 0.3274 | 0.3405 |
|    | 2019 | 0.2921         | 0.3948 | 0.3715 |
|    | 2020 | 0.2531         | 0.4948 | 0.3831 |
| X4 | 2016 | 0.1600         | 0.1374 | 0.2416 |
|    | 2017 | 0.1250         | 0.1078 | 0.1907 |

|    |      |        |        |        |
|----|------|--------|--------|--------|
|    | 2018 | 0.1191 | 0.1136 | 0.1822 |
|    | 2019 | 0.1295 | 0.1348 | 0.1854 |
|    | 2020 | 0.1461 | 0.1911 | 0.2303 |
| X5 | 2016 | 0.2602 | 0.1547 | 0.3417 |
|    | 2017 | 0.3259 | 0.2718 | 0.3345 |
|    | 2018 | 0.2806 | 0.3566 | 0.3182 |
|    | 2019 | 0.2735 | 0.4231 | 0.3379 |
|    | 2020 | 0.2452 | 0.4778 | 0.3414 |

The financial risk warning threshold of the F-score model is 0.0274. If the score is higher 0.0274 than that, the financial risk is still within the controllable range, and a higher score means that the financial risk is relatively small.

There are difficulties in paying off its debts in cash, resulting in its weaker ability to repay its debts. X1 and X4 show the company's debt servicing ability respectively, and it can be seen that Country Garden performs better in 2017; Second, from the trend of the indicators shows that Country Garden's cash flow capacity has been declining continuously in the past three years. The large scale of aggressive expansion should be supported by huge cash flow. The demand for cash flow is larger than other companies, so Country Garden's cash flow is less advantageous than other companies. The results from the F-score model of the financial risk warning model can be seen.

## 5. Empirical Analysis of Influencing Factors of profit and total assets of real estate industry

The study of profit status and total assets change in the real estate industry as a reference standard for the industry has a crucial role in making decisions. This paper adopts a systematic sampling method to select 12 real estate enterprises with typical representatives as research objects, and collects data on assets and corporate profits of the above enterprises in the past five years from 2016 to 2020. With the help of stata analysis software, the influencing factors of profits and total assets of the real estate industry are analyzed in depth.

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

The data required for the study in this paper include real estate profits, total assets and related factors affecting the above variables, mainly using macro data of each real estate company, and the data are obtained by consulting the official websites of each real estate company.

This paper takes to profit (rnet) and total corporate assets (tset) in the real estate industry as the explanatory variables and considers the effects of asset depreciation (decost), shareholders' equity (stock), interest (inter), and total liabilities (debt).

Table 4. Descriptive statistics of each variable

| Variable Name          | Sample size | Average value | Standard deviation | Minimum value | Maximum value |
|------------------------|-------------|---------------|--------------------|---------------|---------------|
| Enterprise             | 60          | 6.50          | 3.48               | 1.00          | 12.00         |
| Year                   | 60          | 2018.00       | 1.43               | 2016.00       | 2020.00       |
| Total Assets           | 59          | 4459.85       | 5416.73            | 38.81         | 20158.09      |
| Net Profit             | 59          | 116.51        | 128.73             | -78.54        | 415.16        |
| Depreciation of assets | 59          | 6.49          | 13.13              | 0.00          | 69.85         |
| Shareholders' Equity   | 59          | 1138.90       | 999.37             | 3.14          | 3498.44       |
| Interest               | 59          | 9.31          | 15.29              | 0.00          | 60.18         |
| Total liabilities      | 59          | 3320.95       | 4857.55            | 10.10         | 17588.06      |
| Log of total assets    | 59          | 7.37          | 1.81               | 3.66          | 9.91          |

|                                   |    |      |      |       |      |
|-----------------------------------|----|------|------|-------|------|
| Logarithm of net income           | 57 | 3.90 | 1.68 | -0.27 | 6.03 |
| Log depreciation of assets        | 58 | 0.64 | 1.64 | -3.51 | 4.25 |
| Logarithm of shareholders' equity | 59 | 6.22 | 1.69 | 1.14  | 8.16 |
| Logarithm of interest             | 44 | 1.22 | 2.00 | -2.66 | 4.10 |
| Log of total liabilities          | 59 | 6.64 | 2.09 | 2.31  | 9.77 |

## 5.2 Analysis of the factors influencing profit and total assets in the real estate industry

Model (1) is the empirical evidence of the total assets of real estate enterprises and each influencing factor. From the empirical results, asset depreciation, shareholders' equity and interest are positively correlated with the total assets of real estate production, and the significance is significant at 1%; Model (2) is the empirical evidence of net profit of real estate enterprises and each of the influencing factors. From the observed results, it also shows a positive correlation. However, the significance is lower relative to total assets.

Table 5. Results of the empirical analysis of profit and total assets in the real estate industry

| Variables              | Model 1  | Model 2  | Model 3  | Model 4  | Model 5  | Model 6  | Model 7 | Model 8 |
|------------------------|----------|----------|----------|----------|----------|----------|---------|---------|
| Depreciation of assets | 0.222*** | 0.167*   | 0.016    | 0.03     | 0.016    | 0.118    | 0.188   | 0.118   |
|                        | -0.079   | -0.084   | -0.021   | -0.019   | -0.017   | -0.17    | -0.167  | 0.116   |
| Shareholders' Equity   | 0.534*** | 0.577*** | 0.365*** | 0.342*** | 0.365*** | 0.376**  | 0.06    | 0.376** |
|                        | -0.067   | -0.119   | -0.026   | -0.022   | -0.02    | -0.168   | -0.193  | 0.128   |
| Interest               | 0.360*** | 0.208*   | 0.038**  | 0.035*   | 0.038**  | -0.001   | -0.062  | -0.001  |
|                        | -0.067   | -0.112   | -0.017   | -0.019   | -0.018   | -0.175   | -0.163  | 0.13    |
| Total liabilities      |          |          | 0.547*** | 0.531*** | 0.547*** | 0.393*** | 0.870** | 0.393** |
|                        |          |          | -0.032   | -0.044   | -0.026   | -0.151   | -0.383  | 0.139   |
| Constant term          | 3.604*** | 0.053    | 1.436*** | 1.690*** | 1.436*** | -1.147   | -2.412  | -1.147  |
|                        | -0.42    | -0.717   | -0.157   | -0.274   | -0.166   | -1.247   | -2.401  | 0.924   |

Model (3) is a Robust robust panel data regression, in which shareholders' equity, interest and total liabilities pass the 10% significance; Model (4) and model (5) are fixed-effects regressions and random-effects models for total assets of real estate firms, respectively; Model (6) is a panel data regression of net profit; Model (7) and model (8) are fixed-effects regressions and random-effects models for the net profit of real estate firms, respectively.

## 5.3 Robustness tests of the factors influencing profit and total assets in the real estate industry

Table 3 shows the empirical results of this paper after applying the weighted least squares method and setting the weights of the variables. From the table, it can be seen that asset depreciation, shareholders' equity, interest, and total liabilities all have a positive relationship with the total assets of real estate enterprises, and the latter three are highly significant. From the size of the coefficients of the variables, the coefficient of total liabilities has the largest impact on real estate enterprises. When total liabilities increase by one unit, real estate enterprises will increase by 0.51 units accordingly. Then, the same robustness analysis is conducted on the net profit of real estate. The analysis results show that asset depreciation negatively correlates with the net profit of real estate enterprises, and the remaining three influencing factors are positively correlated, but the significance is low.

Table 6. Robustness tests of profit and total assets in the real estate industry

|  | Variable Name          | Coefficient value | t-value | P-value |
|--|------------------------|-------------------|---------|---------|
|  | Depreciation of assets | 0.02              | 0.78    | 0.44    |

|                                    | Variable Name          | Coefficient value | t-value | P-value |
|------------------------------------|------------------------|-------------------|---------|---------|
| Real Estate Total Asset Robustness | Shareholders' Equity   | 0.41              | 22.71   | 0.00    |
|                                    | Interest               | 0.06              | 2.48    | 0.02    |
|                                    | Total liabilities      | 0.51              | 25.56   | 0.00    |
|                                    | Constant term          | 1.39              | 10.23   | 0.00    |
| Real Estate Net Profit Robustness  | Depreciation of assets | -0.14             | 0.12    | -1.15   |
|                                    | Shareholders' Equity   | 0.36              | 0.09    | 3.92    |
|                                    | Interest               | 0.07              | 0.11    | 0.63    |
|                                    | Total liabilities      | 0.43              | 0.09    | 4.97    |
|                                    | Constant term          | -1.15             | 0.65    | -1.76   |

## 6. Conclusion

The first issue explored in this paper is the performance of twelve company's business ecology. The external operational ecological characteristics are derived through swot analysis and key financial indicators. Secondly, this paper also explores the financial performance of real states under the tightened financing policy. By analyzing critical financial indicators and making vertical comparisons, we reveal the unique financial characteristics of the real state. Finally, we use stata to discuss the factors that influence profit and total assets in the real estate industry and draw the following conclusions.

(1) Asset depreciation, shareholders' equity and interest are positively correlated with the total assets of real estate. The influence coefficient of total liabilities on real estate enterprises is the largest.

(2) Fast expansion will lead to the slow return of capital and a high risk of capital chain. Small debt ratio puts low pressure on debt servicing. Fast capital turnover is good to strengthen operating capacity.

(3) Little debt pressure does not mean low difficulty paying off debt in cash. The massive aggressive expansion creates less cash flow advantage. If one comprehensive financial risk is small, it may be better in terms of stable asset structure, operating capacity, and sustainable solid operating ability.

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