ISSN : 0974 - 7435 Volume 10 Issue 11

2014

BioTechnology

An Indian Journal

FULL PAPER

BTAIJ, 10(11), 2014 [5281-5288]

Risk degree of the real estate enterprises' development under the economic crisis environment

Mengjiao Zhou

Management Engineering Department of College Mobile Telecommunications, Chongqing University of Posts and Telecommunications, Chongqing, (CHINA)

ABSTRACT

With the rapid development of the economy in China, the real estate industry, as a pillar of the economy booming is developing constantly. Since the economic crisis swept the world, China's real estate industry has been affected a lot to a certain extent. The Chinese government introduced the related policy in order to maintain the stability of the real estate market gradually; this caused unstable situation of the change of the market. At the same time, because the current phenomenon of the real estate market's bubble in our country, the development of real estate enterprises also exists a certain risk. This paper selects the real estate enterprise investment project of Weifang Shandong as the research object, combined with the mathematical theory and the public, we establish Bayesian mode about of the risk of enterprise development in Weifang. Through the analysis of the expected value of the project plan, and follow the principle of maximum benefit, we finally choose the most reasonable solution. But it should be pointed out that, the analysis of real estate investment risk decision in Bayesian method has a certain limitation, we hope that the research play a role in promoting on the development of related fields.

KEYWORDS

Real estate; Enterprise development; Bayesian model; Risk degree; Mathematical model.

INTRODUCTION

The most basic life safeguard for everyone in the country is residential, and the quality of the national life directly affected by the residential comfort, therefore, the development of the real estate have inseparable connection with all of out life. However, due to the effect of economic crisis, the development of the real estate enterprise faces heavily risks. At present, there have been many scholars doing the research on the development of real estate enterprises in our country.

The predecessors have done a lot of effort on researching on the development of China's real estate enterprise, at the same time, it has achieved certain results, for example, Li Zuobin in 2008 did some research on risk analysis of real estate, according to the cited cases, he analyze the risk of the real estate, at the same time, he put forward the corresponding suggestions for the development of real estate enterprises.

Gu Yunchang wrote a study about the real estate's development challenges in the future, by analyzing the situation of our country real estate market's development and the trend of economic development in China at present, he predicted the future trend of real estate development in our country, then finally he came to the conclusion that the process of China's real estate development in the future will face enormous challenges.

This paper makes further analysis and research on the basis of previous studies of the development of real estate enterprises' risk degree under the environment of economic crisis, and through taking real estate enterprise investment decision-making project in Weifang Shandong province as the research object, combined with the mathematical theory and formula, we establish Bayesian mode of the risk of enterprise development in weifang, and eventually we get the ideal result, which provides a theoretical support for the development of the field.

THE ESTABLISHMENT OF THE MODEL

Under the environment of economic crisis, the development of each real estate enterprise can not avoid the existence of risk. Below we choose the rapid and healthy operation of the overall situation -- weifang city as a selection object, which there is no overheating investment, and not the much speculative buying of the investment. Finally we can analyze the risk of the development of real estate enterprises under the environment of economic crisis.

The establishment of Bayesian mode of Weifang real estate enterprise development risk

In order to better study the risk of real estate development of weifang, now we select a case to analyze, the overall indicators of the case project are as follows:the construction area is 92300m^2, the rate of the greenbelt is about 45%,the plot ratio is 0.9-1.9.

Through the rigorous planning and design, we make three kind of solutions: Program one:All construct the highest of top 12 floors of the building; the total has 15 buildings, the total areas are150000 square meters. Capital subsidiary of the total investment are 287 million, the funds of the enterprise itself accounted for 20% of total investments, and the loan money from the bank account for 25% of the total money. Program two: High-rise buildings, the 2 tall buildings of 25 floor and the 8 buildings with top 12 layers match each other, the construction areas are 170000 square meters, the total investments are340 million, the funds of the enterprise itself accounted for17%, the loan money from the bank account for 28%. Program three: Garden villa, it will be 10 buildings, the construction areas are 110000, and the total investments are 233.2 million, the funds of the enterprise itself accounted for25%, the loan money from the bank account for20%.

The following are the future market situation assumptions:

1) The probability is 0.7 means that for the market trend is better than now.

2) The probability is 0.2 means that the market situation is the same as the current market situation.

3) The probability is 0.1 means that the market situation is worse than the current market situation.

According to the Bayesian formula, we make sure the 5 index:

f_1 Other construction fee ;

f_2 The construction cycle ;

f_3 Thecost of the working capital ;

f_4 The price of the finished products ;

f_5 The construction unit cost .

Among them,the weight of f_k is represented by ω_k ,among them K=1,2, 3,4, 5.

Through the calculation of the analysis of future market probability, we get the following TABLE 1-5 of the above five indexes of parameter values.

TABLE 1: The index parameter f_1

State / Scheme	θ_1	θ_2	θ_3
	$p(\theta_1)=0.7$	$p(\theta_2)=0.2$	$p(\theta_3)=0.1$
q_1	3080	2880	2630
q_2	3200	3050	2850
q_3	3620	3300	3040

TABLE 2 : The index parameter f_2

State / Scheme	θ_1	θ_2	θ_3
	$p(\theta_1)=0.7$	$p(\theta_2)=0.2$	$p(\theta_3)=0.1$
q_1	1400	1800	2440
q_2	1700	2180	2910
q_3	1280	2100	3900

TABLE 3 : The index parameter f_3

State / Scheme	θ_1	θ_2	θ_3
	$p(\theta_1)=0.7$	$p(\theta_2)=0.2$	$p(\theta_3)=0.1$
q_1	2	2.5	3.7
q_2	2.2	2.8	4.2
q_3	1.7	3.2	6.2

TABLE 4 : The index parameter f_4

State / Scheme	θ_1	θ_2	θ_3
	$p(\theta_1)=0.7$	$p(\theta_2)=0.2$	$p(\theta_3)=0.1$
q_1	0.198	0.196	0.194
q_2	0.192	0.19	0.187

q_3	0.199	0.195	0.193

TABLE 5 : The index parameter f_5

State Scheme	θ_1	θ_2	θ_3
	$p(\theta_1)=0.7$	$p(\theta_2)=0.2$	$p(\theta_3)=0.1$
q_1	0.272	0.267	0.257
q_2	0.262	0.257	0.242
q_3	0.322	0.312	0.282

Because the calculation process of weight value is very complicated and we need make subjective judgment of the importance of each index, we finally determine the weights of every index by combining with the actual situation to make roughly the correct judgment.

Through the importance of every index, we get the judgment matrix shown in below:

$$A=\begin{bmatrix} a_{11} & a_{12} & a_{13} & a_{14} & a_{15} \\ a_{21} & a_{22} & a_{23} & a_{24} & a_{25} \\ a_{31} & a_{32} & a_{33} & a_{34} & a_{35} \\ a_{41} & a_{42} & a_{43} & a_{44} & a_{45} \\ a_{51} & a_{52} & a_{53} & a_{54} & a_{55} \end{bmatrix}=\begin{bmatrix} 1 & 1/2 & 1/3 & 1/4 & 1/5 \\ 3 & 1 & 3 & 1 & 1 \\ 2 & 1/3 & 1 & 1 & 1/3 \\ 4 & 1 & 3 & 1 & 1 \\ 5 & 3 & 3 & 1 & 1 \end{bmatrix}$$

Through the model of the minimum sum of squares weights, we get:

$$B=\begin{bmatrix} \sum_{i=1\, i\neq 1}^{5} a^2_{11}+5-1 & -(a_{12}+a_{21}) & -(a_{13}+a_{31}) & -(a_{14}+a_{41}) & -(a_{15}+a_{51}) \\ -(a_{21}+a_{12}) & \sum_{i=1\, i\neq 2}^{5} a^2_{12}+5-1 & -(a_{23}+a_{32}) & -(a_{24}+a_{42}) & -(a_{25}+a_{52}) \\ -(a_{31}+a_{13}) & -(a_{32}+a_{23}) & \sum_{i=1\, i\neq 3}^{5} a^2_{13}+5-1 & -(a_{34}+a_{43}) & -(a_{35}+a_{53}) \\ -(a_{41}+a_{14}) & -(a_{42}+a_{24}) & -(a_{43}+a_{34}) & \sum_{i=1\, i\neq 3}^{5} a^2_{14}+5-1 & -(a_{45}+a_{54}) \\ -(a_{51}+a_{15}) & -(a_{52}+a_{25}) & -(a_{53}+a_{35}) & -(a_{54}+a_{45}) & \sum_{i=1}^{5} a^2_{15}+5-1 \end{bmatrix}$$

$$=\begin{bmatrix} 60 & -3.332 & -2.52 & -4.251 & -5.23 \\ -3.332 & -9.363 & -2.52 & -2.01 & -2.52 \\ -2.52 & -2.52 & 16.253 & -2.52 & -2.52 \\ -4.251 & -2.01 & -2.52 & 6.134 & -2.01 \\ -5.23 & -2.52 & -2.52 & -2.01 & -5.542 \end{bmatrix}$$

Through the above result,We can get the corresponding weights:

$$\omega=\begin{bmatrix} 0.068 & 0.211 & 0.118 & 0.277 & 0.326 \end{bmatrix}$$

According to the above weights, we standardized the 5 indexes of the real estate development risk degree under the economic crisis. They are shown in TABLE 6-10.

TABLE 6 : Parameter values of f_1 after standardization

State Scheme	θ_1	θ_2	θ_3
	$p(\theta_1)=0.7$	$p(\theta_2)=0.2$	$p(\theta_3)=0.1$
q_1	1	1	1
q_2	0.780	0.597	0.468
q_3	0	0	0

TABLE 7 : Parameter values of f_2 after standardization

State Scheme	θ_1	θ_2	θ_3
	$p(\theta_1)=0.7$	$p(\theta_2)=0.2$	$p(\theta_3)=0.1$
q_1	0.716	1	1
q_2	0	0	0.680
q_3	1	0.213	0

TABLE 8 : Parameter values of f_3 after standardization

State Scheme	θ_1	θ_2	θ_3
	$p(\theta_1)=0.7$	$p(\theta_2)=0.2$	$p(\theta_3)=0.1$
q_1	0.4	1	1
q_2	0	0.572	0.802
q_3	1	0	0

TABLE 9 : Parameter values of f_4 after standardization

State Scheme	θ_1	θ_2	θ_3
	$p(\theta_1)=0.7$	$p(\theta_2)=0.2$	$p(\theta_3)=0.1$
q_1	0.145	0	0
q_2	1	1	1
q_3	0	0.169	0.145

TABLE 10 : Parameter values of f_5 after standardization

State Scheme	θ_1	θ_2	θ_3
	$p(\theta_1)=0.7$	$p(\theta_2)=0.2$	$p(\theta_3)=0.1$
q_1	0.169	0.226	0.252
q_2	0	0	0
q_3	1	1	1

The selection of the real estate enterprise development plan of weifang based on Bayesian mode

The following is formula of the benefit function expected benefit value:

$$U = \omega_1 f_1 + \omega_2 f_2 + \omega_3 f_3 + \omega_4 f_4 + \omega_5 f_5$$

$$E(U_h) = P(\theta_1)u_{h1} + P(\theta_2)u_{h2} + P(\theta_3)u_{h3}$$

Through the above formula we get TABLE 11:

TABLE 11 : The object list

State Scheme	θ_1	θ_2	θ_3	Expectations (U)
	$p(\theta_1) = 0.7$	$p(\theta_2) = 0.2$	$p(\theta_3) = 0.1$	
q_1	0.362	0.472	0.481	0.406
q_2	0.33	0.384	0.546	0.368
q_3	0.667	0.419	0.368	0.557

According to the calculated result, the expectation of program three is the largest, which means program three is the optimal solution.

Below we'll calculate the risk probability of three programs:

$$\rho_1 = \frac{\sqrt{0.7\times(0.362-0.406)^2 + 0.2\times(0.472-0.406)^2 + +0.1\times(0.481-0.406)^2}}{0.406} = 0.261$$

$$\rho_2 = \frac{\sqrt{0.7\times(0.33-0.368)^2 + 0.2\times(0.384-0.368)^2 + 0.1\times(0.546-0.368)^2}}{0.368} = 0.553$$

$$\rho_3 = \frac{\sqrt{0.7\times(0.667-0.557)^2 + 0.2\times(0.419-0.557)^2 + +0.1\times(0.368-0.557)^2}}{0.557} = 0.226$$

According to the result of the above, we can see that, the largest risk rate is program two, which is much higher than program one and three. But in real life, according to the principle of utility, the risk value of this kind of circumstance can't be taken as a final determinant standard. But we can be more clearly to say that Bayesian method can effectively reduce the risk probability through risk probability.

Through TABLE 11, we can know that the program three has the highest expectations, ita will probably achieve the maximum from theory, however, by calculating the risk degree of the results, its risk degree is very high, at 22.6%.

In order to make our decision more accurate, we take the investigation of the good and bad of the market situation as additional conditions, and through Bayesian method, we revise again the risk probability, it is shown in TABLE 12.

TABLE 12 : The market situation questionnaire

Actual status Investigation situation	The future market is very good	The future market is general	The future market is bad
	θ_1	θ_2	θ_3
The current market is very good S_1	0.834	0.09	0.04
The current market is general S_2	0.09	0.73	0.21
The current market is bad S_3	0.07	0.18	0.75

In order to make the probability more accurate, we get the probability conditions of the future market through the investigation of the conditions of the current market. And then we use the Bayesian model formula:

$$p(\theta_i / s_j) = \frac{p(\theta_i s_j)}{p(s_j)} = \frac{p(\theta_i)\, p(s_j / \theta_i)}{\sum_{k=1}^{3} p(\theta_k)\, p(s_j / \theta_k)} \quad i = 1,2,3$$

We can get TABLE 13 through calculation:

TABLE 13 : The market situation questionnaire

Actual status / Investigation situation	The future market is very good	The future market is general	The future market is bad	$P(S_j)$
	θ_1	θ_2	θ_3	
s_1	0.584	0.018	0.004	0.606
s_2	0.067	0.146	0.021	0.234
s_3	0.049	0.036	0.075	0.16
$P(\theta_j)$	0.7	0.2	0.1	1

Through the above table, we can get TABLE 14:

TABLE 14: Object list

After correction / Investigation situation	$P(\theta_1 / S_j)$	$P(\theta_2 / S_j)$	$P(\theta_3 / S_j)$
s_1	0.223	0.221	0.556
s_2	0.93	0.065	0.0093
s_3	0.186	0.75	0.065

Through the analysis, we know that the present market situation is in good condition, in the following, we will start to modify scheme decision-making of the beginning of the paper, as shown in TABLE 15:

TABLE 15 : The revised result table

State Scheme	θ_1	θ_2	θ_3	Expectations E (U)
	$P(\theta_1 / S_1)$	$P(\theta_2 / S_1)$	$P(\theta_3 / S_1)$	
q_1	0.361	0.470	0.477	0.369
q_2	0.330	0.383	0.547	0.336
q_3	0.664	0.418	0.366	0.643

According to the utility maximum criterion, through TABLE 15 we know that program three has the biggest expectations, as high as 0.643, far beyond program one and program two. We should choose the program three. Here, based on the risk assessment of program three, we know the risk is 6.4%.

CONCLUSION

This paper analyzes the risk of real estate enterprise development degree under the environment of the economic crisis, and by adding the decision scheme of Bayesian into the study of the risk of real estate enterprise development degree, it helps to reduce the risk of its value to a certain extent, then it finally reduces the risk of development of the real estate enterprise from 22.6% down to 22.6%, the total was reduced by 16.2%, which fully proved the validity and rationality of Bayesian decision model, but this method has certain limitations, this paper will further improve it in the future study.

REFERENCES

[1] Wei Zhong-Shu; Probability Theory and Mathematical Statistics Course [M], Beijing: Higher Education Press, **(2008)**.

[2] Xu You-Zhi, Mao Shan-Jun, Wang Jing-Hua; Quantitative Coal Mine Survey Science [M], Xu Zhou: China Mining University, **(1994)**.

[3] Tang Ji-Min; How Mathematical Statistics to Establish into Unified Independent Statistics [J], Vocational Education and Economic Research (Journal of Loudi Vocational Technological College), **1**, **(2006)**.

[4] Anhui coal Mine Geology Bureau the Third Survey Party, Liuqiao the Second Coal Mine Mining Geological Report [R1, Huaibei, **5**, **(2001)**.

[5] Gu Ju-Chuan; Briefly Analysis of Mathematical Statistics Application in Data Screening [J], Inner Mongolia Statistics, **1**, **(2009)**.

[6] Zhang Fu-Zhen; Discuss on Jiangsu Drift Ice Aijingshan Mountain Silver Mine Survey Net Measurement Rationality [Jiangsu Geology, **20(4)**, 23-235 **(1996)**.

[7] Yang Hai-Jie; Application of Mathematical Statistics Method[J], Journal of Chengde Medical College, **4**, **(2005)**.

[8] Zhao Li-Mian; Strengthen "Probability Theory and Mathematical Statistics" Applied Teaching [J], China Education Innovation Herald, **11**, **(2009)**.

[9] Ding Hai-Jun, Li Guo-Cheng; Oil-Gas Field Development Plan Comprehensive Evaluation New Method [J], Natural Gas Industry, **16(4)**, 29-31 **(1996)**.

[10] Chen Jian-Nan; Mathematical Statistics and other Management Techniques Applied Practices in Enterprises Operation Decision [J], Enterprise Science and Technology Development, **6**, **(2008)**.

[11] Zhang Shu-Qiu; Fuzzy Optimization Theory Application in Optimal Selection Oil-Gas Field Development Plan [J], Natural Gas Industry, **13(2)**, 45-48 **(1983)**.

[12] Cai Lun-Meng; Mathematical Statistics Method Application in High Speed Road Subgrade Engineering Quality Control [J], Value Engineering, **11**, **(2009)**.

[13] Xiao Fang-Chun; Fuzzy Grey Element Optimization Theory Application in Optimal Selection Oil-Gas Field Development Plan [J], Daqing Oil Geology and Development, **14(3)**, 31-35 **(1995)**.