

Influences of Managers' Irrational Factors on Enterprise Investment Risk

WANG Bingjie^{[a]*}; YUAN Linsan^[a]; YUE Weili^[a]

^[a]School of Management, University of Ji'nan, Ji'nan, China.

*Corresponding author.

Received 25 August 2013; accepted 9 November 2013

Abstract

The rational investment risk is based on the "economic man" hypothesis. Along with the advancement of modern academic research, the hypothesis has got more and more questions and challenges. On the basis of expatiating on the traditional theory of investment risk, this research uses behavioral economics and psychology related proof and theoretical basis, expounding that the irrational factor of overconfidence has an influence on enterprises investment risk. Through the quantitative factors and reference model of granger causality test, this research obtains the cause and effect of managers' overconfidence and the enterprise investment risk. Therefore, this research provides academic support the for the humanist management strategy of the enterprise.

Key words: Investment risk; Irrational factors; Overconfidence; Granger causality model

WANG Bingjie, YUAN Linsan, YUE Weili (2013). Influences of Managers' Irrational Factors on Enterprise Investment Risk. *Management Science and Engineering*, 7(4), 40-44. Available from: URL: <http://www.cscanada.net/index.php/mse/article/view/j.mse.1913035X20130704.Z2758> DOI: <http://dx.doi.org/10.3968/j.mse.1913035X20130704.Z2758>

INTRODUCTION

In 1776, Adam Smith put forward "economic man" hypothesis in the book named "the wealth of nations", which laid the theoretical basis of modern economic and financial industry and finally formed a theoretical system. However, enterprise investment decision and risk measurement is closely related to the "economic

man" hypothesis. In 1942, Mayo presided over the famous Hawthorne experiment, which pioneered the relationships of the doctrine of precedent. Reversing Adam Smith and others' "economic man" hypothesis, he pointed out the social side of people, namely, people's behavior is not completely controlled by material interest factors. At the same time, he also created the behavior science management theory, which laid the foundation of irrational factors in the economics research. This paper mainly studies the effect of managers' irrational factors on the investment risk.

1. RATIONAL FACTOR RISK MODEL AND ITS DEFECTS

1.1 Theoretical Basis: The Economic Man Hypothesis

The "Economic man" hypothesis, originated from Adam Smith's theory of labor value of social exchange. One of the most commonly used fundamental hypotheses is that the essence of people's all behavior purpose is to have an access to maximum material reward (Ye, 2008).

Its assumption features can be interpreted as: value criterion makes use of an invisible the hand of regulation to regulate and promote the individual pursuit of self-interest behavior. According to the summary, it constructs the resultant force to promote the public interest.

Contemporary economic activity is constructed on the basis of the traditional "economic man" hypothesis. As the theorists extend this definition, the traditional hypothesis has become more generalized. It will help economic theory scholars in different times to deconstruct endless economic phenomenon in more efficiently, and gradually establish a rigorous standard economic theory system.

1.2 Research Ideas of the Traditional Risk Model

As one of the most basic economic activities of modern society, the objective of any investment behavior is to grab

the excess profit. At the same time, the result of the profit is a possibility, which makes it difficult for any investment risk to escape from the risk of sinking. But, the emergence of the risk model is to better measure risk and management risk, and reduce the risk and control it. So the risk model plays a very important role in optimizing the enterprise investment decision and saving the social resources.

Maximizing to avoid the existing investment risk to evaluate the enterprise investment risk more objective and accurate, this paper uses the theory of comprehensive risk management, and regards it as the framework of the risk theory model in this text.

1.3 Indexes of the Rational Risk Model

The rational risk evaluation model, on the premise of "economic man" hypothesis, abandoned some secondary variables. And it simplifies the analysis of the problems, forming an effective analysis frame, which can be used to explain many phenomena in the economy. Through various refining index to measure the various aspects, it can make a comprehensive assessment. There are a total of eight indexes, respectively, market risk, financial risk, technology risk, management risk; political risk, industry risk, natural risk, economic risk. The first four indexes are called non-system risk factors (micro), and after four indexes are called the system factors (macro) (Ye, 2008).

1.4 To Set Up the Rational Investment Risk Evaluation Model

Because the above indicators all have directions, they can't be compared between the two. In order to make different indexes be compared and computed in unity, they must be carried on the dimensionless processing.

1.4.1 Standardization of Evaluation Factors Positively Related to the Investment Risk

Positive index means the numerical value of indexes is positively relative to the investment risk (Wang & Zhou, 2007). According to the dimension formula, such index standardization formula is as follows:

$$P_i = \frac{A_i - \min A}{\max A - \min A} \quad (1)$$

Max A—the maximum value of index A;
 Min A—the minimum value of index A;
 A_i—the first i specific value of Index A;
 P_i—the dimensionless value of A_i.

This formula aims at calculating a relative value, solving the problems that different indexes can not be directly compared and operated.

1.4.2 Standardization of Evaluation Factors Negatively Related to the Investment Risk

Negative index means the numerical value of indexes is negatively relative to the investment risk (Wang & Zhou, 2007). According to the dimension formula, formula is as follows:

$$P_i = \frac{\max A - A_i}{\max A - \min A} \quad (2)$$

Max A—the maximum value of index A;
 Min A—the minimum value of index A;
 A_i—the first i specific value of Index A;
 P_i—the dimensionless value of A_i.

1.4.3 Specific Calculation Method and Steps

First step, determine and weight the factors. When different industries are in risk assessment and assignment, not all indexes are of equal importance. Therefore, according to the characteristics of different industries, we determine the indexes. It is called the weighting, which is divided into the method of subjective values and the method of objective values.

The second step is to calculate the variation coefficient of evaluation indexes and the weight of the variation coefficient method of evaluation index:

i. Calculate the variation coefficient of evaluation indexes:

$$V_K = \frac{\partial_K}{\bar{X}_K} \quad k = 1, 2, \dots, m \quad (3)$$

V_K—the first k index variation coefficient;

∂_K —the first k index standard deviation;

$\bar{X}_K$ —the first k index arithmetic average.

ii. Calculate the weight of the variation coefficient method of evaluation indexes:

$$w_k^o = \frac{v_k}{\sum_{k=1}^m v_k} \quad k = 1, 2, \dots, m \quad (4)$$

w_k^o—the weight of the variation coefficient method of the first k index

Third step, the method of subjective and objective combination empowerment: combination empowerment method uses average method and takes the average value of two kinds of empowerment.

On the fourth step, calculate the investment risk: the obtained weight by last step multiplies by the actual value of each evaluating index. Then each value is added, finally we can get the investment risk under the rational risk model under.

Fifth, compare the risk values and choose the least risky as the best decision-making plan (Wang & Zhou, 2007).

1.5 Shortcomings of Rational Investment Risk Model

From the view of a theoretical point, the optimal decision is not impossible, but social reality is not equal to theoretical assumptions. The assumptions of the rational decision-making model encounter various obstacles. Gradually, people find that many phenomena of policy in practice are difficult to explain. The reason

doesn't lie in its logical system, but in the premise which can be to explain.

a. The "economic man" in economic man hypothesis is not a pure "economic animal". So representatives of different interests, who are influenced by specific individual aspects, will look at problems from their respective interests.

b. As policymakers are affected by the values, value conflicts will usually occur when choosing. Comparison, measure, judgment of value conflict is extremely difficult. Depending on analysis is not able to solve the contradictions of the values, because analysis can't verify values, nor can the administrative command unity people's values.

c. Some people hold the view that "public interest" can be used as decision criteria. But Lindebulos criticized this understanding. He thought that on this question in the form of public interest elements, people have no uniform opinion, and the public interest doesn't agree to each other.

d. Correlation analysis of decision making is not everything. Decisions are limited by the time and resources. TO complex decision-making, we won't make endless analysis for a long period of time. Also we won't cost too costly for analysis, or wait for all the analysis in order and then make a decision, otherwise it will delay time.

e. Bounded rationality when explaining the barriers the theory of rational decision, Hawthorne experiment proposed the theory of "bounded rationality", which is universally recognized now.

2. EFFECTS OF IRRATIONAL FACTORS ON ENTERPRISE INVESTMENT RISK

Among many irrational factors, overconfidence is the most typical.

Overconfidence is expected psychological phenomenon of uncertainty, that when making decisions, manager excessively believe his own judgment with lack of basics.

According to the research of psychology: when individuals of a group compare their own power with the rest of the group, they always tend to think that their own ability is higher than others, Especially the enterprise's senior management are more likely to show the overconfidence than ordinary employees (He, 2005).

Overconfidence often causes top managers overestimate acquisition targets or investment projects. Also, it makes top managers too optimistic to the profitability of goal and industry prospects, resulting in the comprehensive waste of enterprise investment resources. Therefore, it not only increases the operating pressure of enterprise, but also increases the investment risk of the enterprise.

2.1 Method of Overconfidence Measurement

For the method of overconfidence measurement, the theoretical circle has no consensus. As we all know,

measurement methods include enterprise profit forecast deviation, enterprise boom index, the management equity incentive, the vesting period managers hold the stock quantity and so on. Combining with the situation of enterprises and economic development in China, this paper uses the enterprise profit forecast deviation to measure overconfidence (He, 2005). The method is as follows:

$$OC = \frac{P_e - P}{P} \quad (5)$$

OC—managers' overconfidence coefficient

P_e —the expected net profit

P —the actual net profit

2.2 Quantitative Measurement of the Investment Risk: The Mean-Variance Model

The mean-variance model was put forward by Harry Markowitz. It Said that investors' decision-making has two goals: the yield rate as high as possible and the uncertainty of risks as low as possible. The best goal should make the two mutual restrictions of goals to achieve the best balance (He, 2005). The method is as follows:

$$IR_t = \frac{\sigma_t}{E(X)_t} \quad (6)$$

IR_t —the risk value in the first t year;

σ_t —the standard deviation quarterly earnings in the first t year;

$E(X)_t$ —the mathematical expectation quarterly earnings in the first t year.

2.3 Causality Analysis of Overconfidence and Investment Risk

Overconfidence, as a personal characteristic of a manager, belongs to the internal variables of the enterprise operating. And the enterprise investment risk is a kind of operating characteristic, which belongs to the external variables. Logically speaking, there is little contact among the elements of different subjects. But considering that the current enterprise management and operation principle is based on people-oriented, people is a resource coordinator, planner, decision-maker and executor, so people is the core of the enterprise.

So here are two assumptions:

(i) The manager's overconfidence affects the enterprise investment risk.

(ii) The enterprise investment risk is blamed to managers' overconfidence.

The following are arguments on the model of above two assumptions:

Two or more elements of related changes exit a variety of relations. Because we can not determine the association between two elements is only related or of causality. Economist Clive Granger developed a kind of method, which can be used to analyze the causal relationship

among variables, namely the Granger causality test, which is applied to the analysis of the causal relationship among economic variables. The mathematical principle is: first of all, autoregressive time variable Y, then add the regression of the reentry after X. If joining X can have a developed effect on result Y, we call that X and Y have statistical causality, namely the Granger causality (Liu & Guo, 2012). The formula is as follows:

$$IR = \alpha_1 + \sum_{i=1}^p \alpha_{1i} OC_{t-i} + \sum_{i=1}^p \beta_{1i} IR_{t-i} + \mu_{1i} \quad (7)$$

$$OC = \alpha_2 + \sum_{i=1}^p \alpha_{2i} IR_{t-i} + \sum_{i=1}^p \beta_{2i} OC_{t-i} + \mu_{2i} \quad (8)$$

IR —the enterprise investment risk;

OC —overconfidence coefficient;

α , β — the corresponding variable regression coefficient;

P — lag coefficient;

T — time series;

U — correction coefficient.

The steps to test are as follow: first, establish the original hypothesis H0: overconfidence (X) is not the granger reason of investment risk (Y). Regression analysis is needed for twice. First of all, Y and the past values of

Y are regression analysis, and then the past values of Y and X are regression analysis t. Analysis results use a distribution model of statistic test, and compare the sizes to determine the effect of X on Y. IF the result influences significantly we can judge that H0 was not set up. Similarly, repeat this step, then you can test whether Y is the granger reason of X.

2.4 Demonstrate Granger Causality by Examples

The samples is collected from the service center of Tai'an data, the software Eview5 developed by QMS company is used for analysis and calculation, the data comes from 2002 to 2009, which is about more than 800 non-financial listed companies' annual report data of in Shanghai and Shenzhen. Te annual range of macro environment is relatively stable and of strong reference. The data statistical results are shown in the table below:

Validation:

(i) Research on the relationship between the effects of the managers' overconfidence (OC) to the enterprise investment risk (IR) (Hao, Liu, & Lin, 2005).

Corresponding to the proposition, the original assumption H0: managers' overconfidence does not Granger causes the enterprise investment risk. Then, Input two sets of data of the mean and standard deviation into the test software EVIEW5, the result is as follow:

Table 1
2002 to 2009 Data Summary About Non-Financial Listed Companies in Shanghai and Shenzhen

Variable	Minimum	Maximum	Average	Standard deviation
Net profit in the first quarter	-584.08	1412.15	28.64	107.55
Net profit in the second quarter	-186.30	2011.03	43.25	122.50
Net profit in the third quarter	-349.09	1572.74	39.03	116.81
Net profit in the fourth quarter	-960.07	1523.59	27.27	165.55
Annual net profit	-960.07	6519.51	130.78	447.57
Expected annual net profit	-540.00	2994.50	130.78	318.21
Average annual net profit	-1680.00	23800.00	1087.84	1636.79

Table 2
Granger Cause Test Results

Lag order	Original assumption	Data capacity	F statistic	Probability value
Lags:1	A does not granger cause B	813	4.5409	0.0334
	B does not granger cause A	813	0.4439	0.5054
Lags:2	A does not granger cause B	812	2.5413	0.0794
	B does not granger cause A	812	0.2488	0.7798

From the inspection results, we know probability P values are 0.0334 and 0.0794, when the lag coefficient is 1 and 2. Both are less than 10%. The statistical results are very significant, so it can reject the null hypothesis H₀. Thus, we can get that managers' overconfidence is the Granger reason of enterprise investment risk.

(ii) Research on the relationship between the effects of the enterprise investment risk of managers' overconfidence

It can be concluded from the table, no matter the lag coefficient is 1 or 2, the measurement of probability value is greater than the recognized significant standard 10%. There are no significant statistical results, so it accepts the null hypothesis, namely the enterprise investment risk cannot lead to managers' overconfidence (Wu, 2004).

CONCLUSION

Above all, managers' overconfidence is the cause of the enterprise investment risk, and the inherent factors of the managers do affect the investment risk of the enterprise. Overconfidence behavior, such as managers' personality and mood, which is caused by irrational conditions, is more likely to cause the enterprise investment failure. So during the process of the enterprise operation, the management and managers' self-discipline is very necessary. At the same time, the investment risk of the enterprise will not lead to excessive self-confidence, explaining the relative stability of the managers' own attitude. On the other side, it also reflects the complexity and importance of the management of people.

When evaluating the investment risk, we should assess both the external risk, such as policy, economy,

market and law and so on. Also, we cannot ignore the investigation for personal style and risk preference of the final decision maker, and overconfidence of top managers. Only a combination of both, we can minimize enterprise investment risk, the greater investment returns.

REFERENCES

- Hao, Y., Liu, X., & Lin, C. N. (2005). An empirical study of overconfidence and investment decision of senior executives of listed companies in China. *Journal of Management Science in China*, (10), 157-201. (In Chinese).
- He, D. A. (2005). Rational investment model and irrational investment model in the world of economics. *Academic Monthly*, (1), 25-31. (In Chinese).
- Liu, M. H., & Guo, G. J. (2012). Research on the irrational enterprise investment. *Journal of Accounting Monthly*, (9), 74-76. (In Chinese).
- Wang, D. H., & Zhou, X. Y. (2007). Managers' overconfidence and enterprise investment distortions. *Journal of Shanxi University of Finance and Economics*, (4), 56-61. (In Chinese).
- Wu, L. F. (2004). The behavior financial theory explaining the company investment behavior Behind the Irrational investment decisions. *Journal of Nanchang Municipal Party Committee Party School of the Communist Party of China*, (12). (In Chinese).
- Ye, P. (2008). Managers' overconfidence and sensitivity of investment cash flow and investment efficiency. Huazhong University of Science and Technology. (In Chinese).