A Study on the Risk Evaluation System for Financial Management in Colleges and Universities and Its Model Construction under the Background of Informatization

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Abstract

With the continuous development of educational undertakings and the gradual improvement of the level of information construction, financial management in colleges and universities is faced with unprecedented difficulties and financial risks have become increasingly prominent. Therefore, problems that urgently need to be addressed by colleges and universities in China include a study on the evaluation of financial management risk, a correct analysis on the contributing factors and the types of risks, and the establishment of an effective control mechanism and a risk evaluation system. This paper proceeds from the connotation and the characteristics of risk, analyzes the types and the causes of risk in colleges and universities, establishes a corresponding financial risk evaluation system, constructs an early warning model, and puts forward countermeasures to improve the efficiency of college financial management and to strengthen financial risk control and prevention.

Keywords: Informatization, Financial Management, Model Construction.

1. RESEARCH BACKGROUND

1.1 Research Overview

Under the background of the rapid development of informationization, there still exist a number of shortcomings in the construction of the financial management risk evaluation system in colleges and universities. The financial management risk evaluation system in most colleges and universities is still limited to the financial processing plate as the core of construction, while ignoring all aspects of financial management risk forecast and application management of information age data technology. For this purpose, numerous domestic experts and scholars have carried out a substantial amount of data collection and research on this phenomenon, summed up abundant valuable lessons, and improved the measures of the existing risk assessment system (Zhu, 2014). However, by far, there are no systematic and in-depth research results in terms of the financial management risk evaluation system in China’s colleges and universities, and a quantity of conclusions are superficial and difficult to reach the essence of financial management in colleges. Especially, as the era of big data approaches and informatization rapidly progresses, more active factors of influence are invested in the construction of the risk assessment system in colleges and universities. As a consequence, a large quantity of previous outstanding research results are difficult to adapt to the construction and the improvement of the current university risk evaluation system, and reference documents fitting the present situation have been increasingly scarce (Shi, 2014). At present, the domestic research literature on this aspect mainly includes the theory of generalized risk evaluation system proposed by Tsinghua University from the perspective of gravity shift and module building, a paper named An analysis on the Construction of Financial Management Risk Evaluation System in Colleges and Universities proposed by Guilin University of Science and Technology with integrated information technology as the focus of innovation, a theory that proceeds from the practical significance of adapting to the information age to college financial management risk evaluation system put forward by Central South University and so on. Also, these theories provide a favorable train of thought and practice for the future academic study on the financial management evaluation system of colleges and universities.
1.2 Research Objective

This paper proceeds from the concept of financial management risk in colleges and universities as well as the connotation and the characteristics of the evaluation system, combines the background of big data and the rapid development of information technology, makes a comprehensive consideration of various influencing factors and the forming reasons of the existing imperfect risk assessment system on the basis of existing research results and experience, and puts forward scientific and rational solutions to the construction and the perfection of the financial management risk evaluation system in colleges and universities of the new era (Li, 2015). Besides, various types of data modeling are fully applied to enhance the feasibility of putting theory into practice. In this way, some common problems in the financial management risk evaluation system of colleges and universities are thoroughly solved, such as late transmission of information and insufficient risk prediction, thereby improving the operational efficiency of the system (Liu, 2015).

2. OVERVIEW OF COLLEGE FINANCIAL RISK

2.1 The Concept of Risk

The term, risk, is derived from the western economic theory, and scholars at home and abroad have a different understanding of the meaning of risk. In general, the definition of risk refers to the difference between the actual results and the expected results in a given period of time and in a particular case. In most cases, it refers to the extent and the likelihood of some adverse outcomes and certain losses. Risk is featured with duality, uncertainty, controllability, knowability and other characteristics. Duality refers to that risks are likely to bring about additional earnings, losses and adverse results, and risk and income are directly proportional. Uncertainty means that the outcome of future events will change with the objective environment and the subjective predictions, that is, the uncertainty of objectivity and subjectivity. Controllability and knowability indicate that risks have a certain rule and can be predicted and judged by means of the technical approach. In this way, risks can be controlled and prevented (Chen, 2012).

2.2 The Connotation and the Characteristics of Financial Management Risk

2.2.1 The Connotation of Financial Management Risk

The understanding of financial risk mainly lies in a narrow and a broad sense. There are two kinds of explanations in the narrow sense of financial risk. In view of the first explanation, financial risk refers to the probability of economic losses when difference appears in an enterprise’s expected income and actual financial returns due to the uncontrollable and expected factors in the process of financial activities such as income, distribution, investment and financing. The second explanation argues that the risk of payment ability is influenced due to the difference in the financial structure of the enterprise.

The generalized financial risk mainly refers to the possibility of causing the loss of financial results and conditions when difference occurs in an enterprise’s expected earnings and gained earnings due to the unpredictable, uncontrollable or uncertain factors in the process of financial activities. Financial risk in a broad sense is defined on basis of the overall financial concept and the financial management activities of enterprises as a whole, which runs through various financial activities of enterprises. Financial risks can be divided into four major categories: income distribution, capital recovery, financing and investment (Li, 2012). (Figure 1 illustrates the connotation of financial risk)

Figure 1. Connotation of Financial Risk
2.2.2 Characteristics of Financial Risk Management

Financial risk is an economic phenomenon of objective existence, which is mainly featured with four characteristics: progressiveness, compensability, ambiguity and comprehensiveness (Peng, 2012). First of all, competition and risk coexist and assume the corresponding financial risks. In this way, colleges or enterprises can be pushed to the most drastic situation; the competitiveness of universities and enterprises can be enhanced; its financial management can be improved and economic efficiency can be elevated, which is the embodiment of progressiveness. Compensability indicates that production operators will make more efforts to improve the operating results to compensate for the loss of risk under the premise that risk brings about profits. Uncertainty, also known as ambiguity, mainly means that risk is formed due to the uncertainty of losses in the financial business process caused by various factors. In the end, the financial management of colleges and enterprises is an entirety, and financial risk runs through every step of the financial movement. Hence, financial risk is a comprehensive reflection of a variety of uncertain factors in the business process and financial activities, which is known as comprehensiveness (Zhang, 2011). (Figure 2 demonstrates the characteristics of financial risk)

![Figure 2. Financial Risk Characteristics](image)

2.3 Types and Causes of Financial Management Risk in Colleges and Universities

Financial management risk in colleges and universities is the result of risks faced by colleges in the process of capital operation. Compared with the financial management risk of enterprises, the financial management risk of colleges and universities is only to meet the needs of the society, which is not examined from the aspects of capital circulation, investment and financing (Liu and Wang, 2011). To this end, this paper analyzes the financial management risk of colleges and universities, which is divided into two aspects: capital operation risk and debt risk.

2.3.1 Capital Operation Risk

The risk of capital operation refers to the capital loss caused by various influencing factors or differences in the expected return on funds and actual income in the process of delivering and scheduling funds. It is a prerequisite for the development of various undertakings in schools to prevent the operation risk of the funds, to directly provide services for the logistics, the industrial and the scientific research of schools, and to improve the economic and social benefits of the funds.

What’s more, in practice, it is found out that capital operation is affected by natural, cultural, economic, political and other factors in most cases, which will often bring about serious losses to the financial risk of colleges and universities. For this purpose, as far as capital operation is concerned, colleges and universities should attach particular significance to debt risk, investment risk, management system and institutional risk, so as to ensure the normal operation of university funds (Geng, 2011).
2.3.2 Debt Risk

The debt risk of colleges and universities refers to the probability when colleges misjudge their own financial situation and consequently make bad debts or excessive debts from commercial banks and other financial institutions. In recent years, a number of colleges and universities blindly expand the scale of enrollment under the guidance of strong school attendance pressure and ignore numerous contradictions existing between their own teaching conditions and growing demand from students. In case of school budget deficit and insufficient construction funding, most schools will take bank loans to solve the dilemma. But it is undeniable that this method is a fast and direct solution to address the urgent needs of colleges and universities, but also brings about many risk and dangers to the financial management of colleges and universities (Deng, 2010). In essence, schools have an insufficient awareness of debt risk, hold a high opinion of their loan repayment capacity, lack a construction mechanism for financial management risk assessment, blindly raise the proportion of loans, which greatly enhances the financial management difficulty of the schools in the future.

3. THE CONSTRUCTION OF THE RISK EARLY WARNING MODEL FOR COLLEGE FINANCIAL MANAGEMENT UNDER THE BACKGROUND OF INFORMATIONIZATION

3.1 The Construction of the Risk Warning Model of College Financial Management

3.1.1 Selection of Risk Early Warning Indexes

In order to study the college financial management risks more conveniently, this paper selects five indexes that are the most closely related to the financial situation of colleges and universities: $X_1$ (availability ratio of enterprise funds), $X_2$ (return on asset), $X_3$ (potential payment capacity), $X_4$ (self-sufficiency ratio of expenditure) and $X_5$ (assets-liabilities ratio). Specifically, $X_2$ is the profitability index; $X_4$ is the operational performance index; $X_1$ is the development potential index; $X_5$ and $X_3$ are the solvency indexes. The related matrix of these five indexes is illustrated in Table 1.

<table>
<thead>
<tr>
<th></th>
<th>$X_1$</th>
<th>$X_2$</th>
<th>$X_3$</th>
<th>$X_4$</th>
<th>$X_5$</th>
</tr>
</thead>
<tbody>
<tr>
<td>$X_1$</td>
<td>1</td>
<td>0.1</td>
<td>-0.2</td>
<td>-0.09</td>
<td>0.12</td>
</tr>
<tr>
<td>$X_2$</td>
<td>0.1</td>
<td>1</td>
<td>0.4</td>
<td>0.33</td>
<td>0.21</td>
</tr>
<tr>
<td>$X_3$</td>
<td>-0.2</td>
<td>0.4</td>
<td>1</td>
<td>0.34</td>
<td>0.23</td>
</tr>
<tr>
<td>$X_4$</td>
<td>-0.09</td>
<td>0.33</td>
<td>0.34</td>
<td>1</td>
<td>0.11</td>
</tr>
<tr>
<td>$X_5$</td>
<td>0.12</td>
<td>0.21</td>
<td>0.23</td>
<td>0.11</td>
<td>1</td>
</tr>
</tbody>
</table>

As indicated by the table, the correlation between the five indexes selected in this paper is weak, indicating that the correlation between the five selected financial indexes is not significant, that no multiple collinearity relationship exists, that the efficiency of discrimination can be relatively improved.

3.1.2 The Construction of the Risk Early Warning Model

In this paper, the full model method is applied to construct a risk early warning model. First, the relevant discriminant function is established according to the five indexes. Furthermore, the linear decision function is constructed based on the non-standardized discriminant function coefficient table generated by these five variables.

<table>
<thead>
<tr>
<th></th>
<th>Function</th>
</tr>
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<tbody>
<tr>
<td>$X_1$</td>
<td>13</td>
</tr>
<tr>
<td>$X_2$</td>
<td>-0.3</td>
</tr>
<tr>
<td>$X_3$</td>
<td>5.5</td>
</tr>
<tr>
<td>$X_4$</td>
<td>8</td>
</tr>
<tr>
<td>$X_5$</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>-0.6</td>
</tr>
<tr>
<td></td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td>9</td>
</tr>
<tr>
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<td>3</td>
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<tr>
<td></td>
<td>9</td>
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<tr>
<td></td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>-3</td>
</tr>
</tbody>
</table>
The function is derived as follows:

\[ Y_1 = 13X_1 - 0.3X_2 + 5.5X_3 - 8X_4 + 5X_5 - 5 \]

\[ Y_2 = -0.6X_1 + 0.01X_2 + 0.4X_3 + 9X_4 + 3X_5 - 6 \]

\[ Y_3 = 9X_1 + 0.1X_2 - 7.7X_3 + 7X_4 - 0.4X_5 + 0.2 \]  \hspace{1cm} (1)

The values of the five indexes are substituted into the above formula to calculate the discrimination.

In the end, the discriminant value is judged by the classification discriminant function coefficient table in Fig. 5.

**Table 3** Classification Discriminant Function Coefficients Table

<table>
<thead>
<tr>
<th>Function</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>(X_1)</td>
<td>34</td>
<td>112.2</td>
<td>33</td>
<td>61</td>
</tr>
<tr>
<td>(X_2)</td>
<td>-0.5</td>
<td>-2.3</td>
<td>-0.1</td>
<td>-4</td>
</tr>
<tr>
<td>(X_3)</td>
<td>42</td>
<td>78</td>
<td>70.4</td>
<td>50</td>
</tr>
<tr>
<td>(X_4)</td>
<td>35</td>
<td>-2.5</td>
<td>30</td>
<td>70</td>
</tr>
<tr>
<td>(X_5)</td>
<td>18</td>
<td>56.6</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>(Constant)</td>
<td>-19.3</td>
<td>-34</td>
<td>-33</td>
<td>-56</td>
</tr>
</tbody>
</table>

The discrimination model established according to the above table is as follows:

\[ N_1 = 34X_1 - 0.5X_2 + 42X_3 + 35X_4 + 18X_5 - 19.3 \]

\[ N_2 = 112.2X_1 - 2.3X_2 + 78X_3 - 2.5X_4 + 56.6X_5 - 34 \]

\[ N_3 = 33X_1 - 0.1X_2 + 70.4X_3 + 30X_4 + 44X_5 - 33 \]

\[ N_4 = 61X_1 - 4X_2 + 50X_3 + 70X_4 + 44X_5 - 56 \]  \hspace{1cm} (2)

Five indexes variables are substituted into the above discriminant function to determine the categories of college financial risks. The calculated values are compared with \(N_1\), \(N_2\), \(N_3\), and \(N_4\). If the value of \(N_1\) is the largest, the accuracy rate is 1; when \(N_2\) has the largest value, the accuracy rate is 0.85; if the value of \(N_3\) is the largest, the accuracy rate is 0.8; when \(N_4\) indicates the largest value, the accuracy rate is 0.75. In the end, the samples of universities are calculated and its accuracy probability is 0.91, indicating that this early warning model can be used to analyze the risk situation of colleges and universities.

3.2 An Empirical Analysis on the Early Warning Model for College Financial Management Risk

In order to verify the correctness of the above model, this paper takes R colleges in H province as an empirical analysis.

The university is an ordinary undergraduate institution, with fixed assets of 230 million yuan, a construction area of 1.2 million square meters and a floor area of 3 million square meters. There are 33,922 full-time students, 9 experts, 432 retired staff, 3,453 graduate students, 453 doctoral students and 300.16 undergraduate students. The balance sheet and the income and expenditure statement of this school are taken as the reference materials to evaluate its financial risk situation.

The first step is to calculate the values of indexes at all levels:
$X_1=0.98$, indicating that the school’s enterprise funds are relatively active.

$X_2=0.33$, indicating general profitability of the school.

$X_3=4$. The values are selected from four months, without exceeding the warning line.

$X_4=0.7$. The index is generally about 0.5, so the school has strong self-supply ability.

$X_5=0.32$. The index is not high, indicating that the school has higher risk of assets and liabilities.

Then, the above discrimination model is adopted to calculate the values of classification: $N_1 = 50.33, N_2 = 83.55, N_3 = 70, N_4 = 66.55$.

In view of the results, the value of $N_2$ is the largest. It can be concluded that the school falls into the second category and the risk situation is about 0.85. It is indicated that the financial management of the school is in an unfavorable condition and the financial risks are within the controllable range.

Through the establishment of an early warning model, colleges and universities can determine their respective categories, so as to further analyze the financial situation risk categories of the school, to timely identify and address the condition occurring in the process of college financial operation, and to develop different policies for colleges and universities with different risk conditions. Therefore, the risk early warning model holds a strong guiding significance to the financial management in colleges and universities.

4. CONTROL MEASURES OF COLLEGE FINANCIAL MANAGEMENT RISK UNDER THE BACKGROUND OF INFORMATIZATION

4.1 Realize the Path

The main function of the financial management system in colleges and universities is to manage the financial affairs of colleges and universities reasonably and scientifically. Through the establishment of the system, the needs of financial management in all levels of the society can be satisfied (Tang, 2008). Besides, the construction of a real financial management risk assessment system must be equipped with a strong executive team, correct development ideas, firm leadership and corresponding safeguard measures and a realization approach.

First of all, there must be a certain degree of technology support of scientific informatization. In recent years, colleges and universities are increasingly competitive; their focus of the work is constantly shifting; financial management also requires informatization to provide its corresponding technical support. In addition, high-tech development also enhances the capabilities of data analysis, processing, collection, application of information and achieves real-time information sharing and fast delivery. Therefore, in the context of informatization, China’s college financial management needs a comprehensive and active collection as well as timely processing of information. Secondly, the financial management of colleges and universities should be designed and planned and the current situation of the school should be understood from the perspective of the overall height and development, such as financial management condition, informatization basis and organizational structure. Furthermore, an in-depth study should be conducted in terms of the real needs of teachers, students, teaching auxiliary departments, teaching units and school leaders, and learning activities should be exchanged with partner schools, financial sectors or government departments. In addition, relevant personnel and experts should be organized to carry out a detailed design and planning of the financial management system of colleges and universities, to put forward the corresponding construction plan, and to lay a foundation for the construction of financial management risk evaluation system of colleges and universities. In the end, there must be a reasonable mechanism for prevention. Because of the complexity of the financial management system in China, the process of financial management is greatly risky (Zhang, 2017). These risk events usually stem from within the school, the finance department or the superiors, and possibly within the system or within the financial sector. Once these events happen, enormous losses will occur to the school’s financial management. Therefore, a reasonable risk prevention mechanism should be constructed to ensure the normal conduct of financial management in colleges and universities.
4.2 Safeguard Measures

Under the background of informationization, the safeguard measures realized by the financial management risk evaluation system in colleges and universities mainly include scientific management, strong financial support and energetic support from leadership.

First of all, the scientific and normative nature of the process should be guaranteed in the construction and the implementation of the financial management risk evaluation system in colleges and universities. A possible small mistake will cause great trouble and even irreversible damage to the team. A scientific management system, advanced management ideas, strict internal control measures, reasonable business processes, innovative means of service and improved rules and regulations afford a forceful guarantee for the financial management of colleges and universities. Secondly, the construction of financial management system in colleges and universities can not be completed overnight, which should be continuously improved and upgraded after its completion on basis of the development of financial management and career in schools. The coordination between interest relationship and system demonstration as well as the realization and the construction of the system require a strong financial support. Moreover, the financial management risk evaluation system of colleges and universities is also in continuous progress. With the change in internal and external environment and the development of science and technology, the investment of its funds also needs to be raised. Only in this way, can the construction and the implementation of financial management risk evaluation system in schools play a real role in achieving the objectives of system construction. In the end, the construction of the financial management risk evaluation system in colleges and universities is a project involving the whole school. More importantly, it brings the change of the financial management system and the transformation of the concept. Therefore, school leaders should offer vigorous support to recognize the significance of advanced financial management risk thought, center schools’ development goals, educational philosophy and development direction, enlarge the investment in financial, human and material resources, and fully support the implementation and the construction of the financial management risk assessment system in colleges and universities, so as to drive managers at all levels to accept advanced financial management ideas (Li, 2009).

5. CONCLUDING REMARKS

At present, the status of financial management of colleges and universities has entered the period of high risk management. To this end, the urgent tasks of the decision-making management of colleges and universities involve how to effectively, systematically and comprehensively analyze the efficient operation of financial management, to understand the problems in the financial management process through the establishment of a corresponding early warning model, and to control, forecast and inspect the dangers in the financial management of colleges and universities in a reliable, accurate and timely way (Wang, 2013). The main objective of this paper is to establish a risk evaluation system and an early warning model for the financial management in colleges and universities. Besides, corresponding risk control measures are put forward according to the complexity of the financial management in colleges and universities, and some reference is provided for the normal development of financial management risk in colleges and universities.

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