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Research on GSEC's Restructuring Financial Risk

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Abstract: *State-owned enterprise restructuring is an important means to enhance its comprehensive competitiveness, and reducing financial risks is the key to improving the efficiency and quality of restructuring. This article takes GSEC as the research object and uses AHP-Fuzzy to analyze the company's financial risks from four aspects: pricing risk, financing risk, debt repayment risk, and integration risk. Based on the results of the risk evaluation, targeted recommendations are put forward to control the financial risks in the restructuring of state-owned enterprises.*

Keywords: *Asset reorganization, financial risk, fuzzy analytic hierarchy process*

1. Introduction

Asset reorganization can generate synergies [1], optimize capital structure [2], improve resource allocation efficiency [3], enhance industry competitiveness [4], and improve company operating performance [5]. However, there is great uncertainty in corporate restructuring, and restructuring failures are not uncommon [6].

State-owned enterprises are an important pillar of the national economy [7]. Deepening the reform of state-owned enterprises will help build a new development pattern. The scale of asset reorganization in my country's state-owned enterprises is increasing, the forms and methods of reorganization are constantly updated, and the system tends to be perfected in the reform. However, restricted by factors such as industry distribution, industrial structure, and policy burdens of state-owned enterprises, the reform of state-owned enterprises still has a long way to go. Among them, the debt crisis of state-owned enterprises is an important factor affecting investment and mergers and acquisitions. Therefore, state-owned enterprises must attach great importance to financial risks in the process of restructuring [8].

Therefore, this article takes various factors that cause financial risks as an entry point to study the operating conditions and possible financial risks before and after the reorganization of Gansu Engineering Consulting Group Co., Ltd.(GSEC), namely, pricing risk, financing risk, debt repayment risk and integration risk. However, the traditional financial risk evaluation method is only applicable to a specific time, a specific region, and a specific industry. Therefore, this paper selects the fuzzy analytic hierarchy process (AHP-Fuzzy), which aims to hierarchize and quantify complex system indicators, combine quantitative analysis with qualitative judgment, and improve the accuracy of evaluation.

2. Build a Fuzzy Analytic Hierarchy Model

2.1. Determine the Evaluation Index

In order to accurately measure risks, companies should dissect the problem from top to bottom into multiple levels such as target layer, guideline layer, and index layer, and perform quantitative analysis on all indicators within each layer. When constructing the evaluation index layer, according to the importance of the degree of impact on the problem to be solved, taking into account the overall, systematic and dynamic nature, the evaluation indexes of the guideline layer and the index layer are determined respectively.are shown in Figure 1

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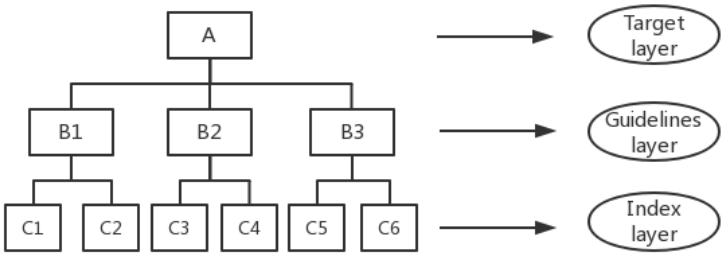

Fig 1: Analytic hierarchy model

2.2. Determine the Index Weight

Due to the complexity of the indicators, it is necessary to determine the relative importance of the evaluation indicators. The judgment matrix [9] can calculate the relative importance of a certain factor at this layer to the upper-layer related factors, and use the 1-9 scale method to quantify the importance of any two factors at different layers to obtain quantification The judgment matrix. The meaning of each level of scale in 1-9 scale method is shown in Table 1.

Table 1: The meaning of each level of 1-9 scaling method

Standard value	Meaning
1	Ci element and Cj element have the same influence
3	The influence of Ci element is slightly stronger than that of Cj element
5	The influence of Ci element is stronger than that of Cj element
7	The influence of Ci element is significantly stronger than that of Cj element
9	The influence of Ci element is absolutely stronger than that of Cj element
2,4,6,8	The ratio of the influence of the Ci element to the Cj element is between the above two adjacent levels
1,1/2,…,1/9	The ratio of the influence of the Ci element to the Cj element is the reciprocal number of the above aij

Assuming that there are n index elements at each layer, after comparing the two indexes, let the importance scale of the i-th index and the j-th index be $a_{ij}\left(i=1,2,3,\cdots,n;\ j=1,2,3,\cdots,n\right)$. According to the important scale, different levels of n-th order judgment matrices can be obtained:The judgment matrix of order n is as follows:

$$\mathbf{A}=\begin{bmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{bmatrix}$$

According to the constructed n-th order judgment matrix, the eigenvector of the matrix is solved, and then the eigenvector is processed to obtain the index weight. In order to ensure that the weight value of the evaluation index is objective and accurate, the judgment matrix must be tested for consistency. The test formula is as follows:

$$C_R = C_I \Big/ R_I$$

See Table 2 for specific random consistency indicators. When $C_R \le 0.1$, it is considered that the judgment matrix A meets the consistency test.

Table 2: The value of the average random consistency index RI

Order	1	2	3	4	5	6	7	8	9
RI	0.00	0.00	0.58	0.90	1.12	1.24	1.32	1.41	1.45

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2.3. Determine the Evaluation Level

According to the theory of fuzzy mathematics, the factor set, evaluation set and membership matrix are determined, and the single-level sorting is implemented. On this basis, the total sorting of the levels is determined. The analysis steps of the fuzzy analytic hierarchy process are shown in Figure 2.

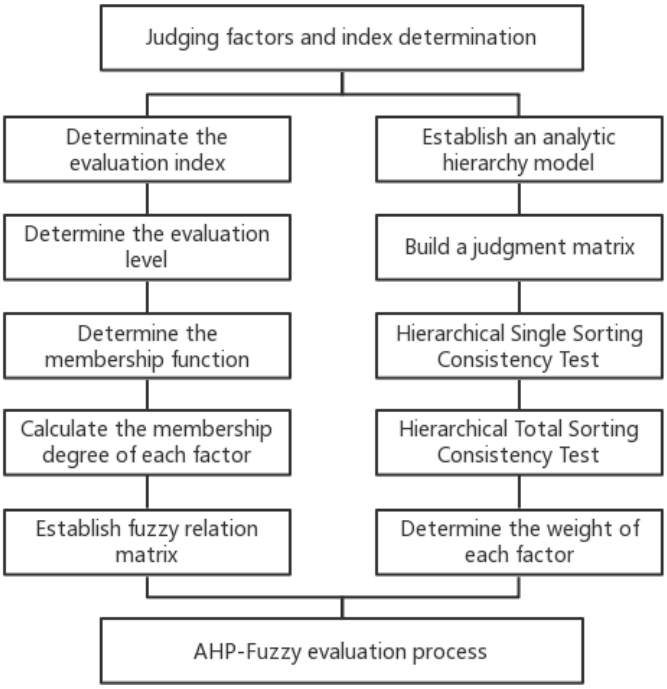

Fig 2: AHP-Fuzzy evaluation process

3. Financial Risk Evaluation of GSEC Based on AHP-Fuzzy

3.1. Establish a Financial Risk Evaluation System

Through expert interviews and field research, this article divides GSEC's restructuring financial risks into four types of risks, namely, pricing risk, financing risk, debt repayment risk, and integration risk. This article selects 11 evaluation indicators to construct a financial risk evaluation indicator system, with a view to comprehensively evaluating the financial risks of GSEC's restructuring. According to the selection principle, the selected targets are divided into target layer M, guideline layer Z and index layer C. The evaluation indicators are shown in Table 3. In this evaluation system, the target layer M represents the evaluation of corporate financial risks. At the same time, the target layer M is decomposed into four guideline levels: pricing risk Z1, financing risk Z2, debt repayment risk Z3, and integration risk Z4. Guideline layer indicators continue to be subdivided into index levels covering 11 specific financial indicators

Table 3: Evaluation Index

	Guidelines layer Z	Index layerC
GSEC M&A Engineering Consulting Group Financial Risk Evaluation System M	Pricing risk Z1	financial risk of Target company C1
		Choice of valuation method C2
		Pricing environment risk C3
	Financing risk Z2	Financing environment risk C4
		Capital structure risk C5
		Financing cost risk C6
	Debt risk Z3	Short-term debt service risk C7
		Long-term debt service risk C8
	Integration risk Z4	Financial environment difference risk C9
		Goodwill impairment risk C10
		Risk of stock price changes during the integration phase C11

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3.2. Determine the Weight of Financial Risk Evaluation Indicators

3.2.1. Build a judgment matrix

This article uses the expert scoring method to establish a judgment matrix, and comprehensively scores the financial indicators and non-financial indicator risk factors that affect GSEC's asset restructuring. The 11 evaluation indicators listed in Table 3 are compared in pairs to determine the relative importance of each evaluation indicator, and the judgment matrix of the criterion layer M-Z and the standard layer Z-C is shown in Table 4 and Table 5.

Table 4: Standard M-Z judgment matrix table

Index	Z1	Z2	Z3	Z4
Z1	1	2	1/3	1/2
Z2	1/2	1	1/3	1/2
Z3	3	3	1	1/2
Z4	2	2	2	1

Table 5 Standard layer Z-C judgment matrix table

Index	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11
C1	1	1/2	1/2								
C2	2	1	2								
C3	2	1/2	1								
C4				1	2	1/2					
C5				1/2	1	1/2					
C6				2	2	1					
C7							1	1/2			
C8							2	1			
C9									1	1/2	1
C10									2	1	2
C11									1	1/2	1

3.2.2. Calculate the initial Weighted Weight of the Indicator

According to the established guideline-layer index weights and the corresponding index-layer index weights, the initial weighted weights of 11 evaluation indexes can be obtained is shown in Table 6.

Table 6: Initial weighting table of evaluation indicators

	Guidelines layer Z	Weighted weight	Index layerC	Weighted weight
GSEC M&A Engineering Consulting Group Financial Risk Evaluation System M	Pricing risk Z1	0.174	financial risk of Target company C1	0.034
			Choice of valuation method C2	0.085
			Pricing environment risk C3	0.054
	Financing risk Z2	0.123	Financing environment risk C4	0.038
			Capital structure risk C5	0.024
			Financing cost risk C6	0.060
	Debt risk Z3	0.327	Short-term debt service risk C7	0.109
			Long-term debt service risk C8	0.218
	Integration risk Z4	0.376	Financial environment difference risk C9	0.084
			Goodwill impairment risk C10	0.188
			Risk of stock price changes during the integration phase C11	0.094

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3.3. Determine the Financial Risk Level of GSEC

3.3.1. Establish Fuzzy Relation Matrix

The factor set U,U=(C_1,C_2,...,C_{11}), is established based on the selected 11 evaluation indicators. At the same time, establish a financial risk rating set P= (low risk, medium risk, high risk). In order to facilitate the calculation, assign a value to the financial evaluation level P. The evaluation set after the assignment is P=(1, 2, 3), 1 represents low risk, 2 represents medium risk, and 3 represents high risk. According to GSEC's reorganization of financial data and actual conditions, experts scored and evaluated the risk levels of 11 evaluation indicators based on GSEC's restructuring financial data and actual conditions. We build a fuzzy relationship matrix $R_{11\times3}$ based on the scoring results of experts, as shown below:

$$\mathbf{R}=\begin{bmatrix}0&2&0\\1&0&0\\1&0&0\\1&0&0\\0&2&0\\0&2&0\\0&0&3\\0&2&0\\1&0&0\\0&2&0\\0&2&0\end{bmatrix}$$

3.3.2. Determine the Level of Financial Risk

The index weight vectors of the criterion layer and the index layer are known:

$$\mathbf{W}_{MZ}=\left[0.174,0.123,0.327,0.376\right]^{T}$$

$$\mathbf{W}_{ZC1}=\left[0.198,0.490,0.312\right]^{T}$$

$$\mathbf{W}_{ZC2}=\left[0.312,0.198,0.490\right]^{T}$$

$$\mathbf{W}_{ZC3}=\left[0.333,0.667\right]^{T}$$

$$\mathbf{W}_{ZC4}=\left[0.250,0.500,0.250\right]^{T}$$

Multiply the weight index and the single risk level to obtain the fuzzy comprehensive evaluation set B=(0.272, 1.238, 0.327). According to the principle of maximum membership degree, the financial risk level of GSEC's restructuring can be obtained as medium risk.

4. Conclusion and Suggestion

4.1. Conclusion

This article attempts to construct a financial risk evaluation index system with 11 specific indicators at three levels of GSEC's asset reorganization, and uses the AHP-Fuzzy method to quantify the 11 evaluation indicators to determine the financial risk situation. Judging from the case results, GSEC's financial risk evaluation results are rated as medium risk, and the company should pay attention to financial risks; from the weight of secondary evaluation indicators, short-term debt risk, long-term debt risk, and goodwill impairment risk account for a relatively large amount, indicating Companies must pay attention to financial budget control, and should build financial early warning models, strengthen asset investigations, and broaden financing channels to reduce financial risks.

4.2. Suggestion

4.2.1. Build a Financial Early Warning Model

There is moderate financial risk in the process of restructuring. Building a financial risk early warning model will help companies test financial risks. aAt the same time, building a financial risk

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early warning model can actively respond to and resolve financial risks to prevent losses from expanding. Specifically, GSEC can learn from the credit rating evaluation method of the banking system, and extract the factor indicators to measure financial risks on the basis of fully studying the corporate activities and influencing factors associated with financial risks. By quantifying financial risk influencing factors and grading and setting the weights of different indicators, the risk warning standards are determined to grasp the level of financial risks that the enterprise may face.

4.2.2. Strengthen Asset Investigation

In the restructuring activities of GSEC, the weight of the integrated risk indicator is as high as 0.376, and the weight of the goodwill impairment risk indicator is 0.188. Therefore, it is necessary to prevent high merger and acquisition premiums. On the one hand, hiring intermediary agencies to conduct net worth investigations and cross-checking of assets to accurately grasp the actual holdings of assets; on the other hand, the reorganizing party's inventory and review of the assets of the reorganized party should adopt a comprehensive approach to determine the relatively reasonable total assets.

4.2.3. Broaden Financing Channels

In the financial risk evaluation, the weight of the debt repayment risk index is as high as 0.327. Therefore, in order to ensure the high-quality development of the enterprise, one must determine the best asset-liability ratio of the enterprise to ensure the long-term and healthy development of the enterprise; At the same time, pay attention to policy changes and make reasonable use of relevant policies to eventually issue corporate bonds at a lower financing cost. Finally, the corporate must use multiple financing methods such as financial leasing, debt financing, and equity financing to ease the pressure of debt repayment.

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