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The Fuzzy Analysis of Small and Medium-Sized Enterprises's Financing Effciency

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ABSTRACT: *The existence and development of small-and-medium-sized enterprises is an ever-lasting problem worldwide .The financing is necessary and indispensable for small-and-medium-sized enterprises. There are five factors affecting the financing efficiency of small-and-medium-sized enterprises among which are: financing cost, efficiency of utilized capital, the formality of financing means, the freedom of financing agency and capacity for consolvency .The financing efficiency and its evolution indicators are indefinite concepts, i .e. they are the concepts with ambiguity (ies). Therefore, it is necessary to use the compound ambiguous mathematical method, (which has become a matured analytical mathematical method) to analyze them. Using ambiguous compound evaluation method, the paper tries to analyze and evaluate the financing efficiency of small-and-medium enterprises based on the analyses of characteristics of financing in china's small-and-medium enterprises as well as the comparisons of financing with equity, bonds and internal financing .The concrete analytical steps are as follows: a) build factors set, b) build weights set (score set), c) ambiguous evaluation with single factor, d) compound ambiguous evaluation with multi-factors*
Key words: *small-and-medium-sized enterprises; financing efficiency compound ambiguous evaluation*

I. INTRODUCTION

SMEs have some advantages of working fast, internal relations harmonious, and good at capturing opportunities. However, compared with large enterprises, SMEs lack of funds and economic strength is weak. The study of financing efficiency of SMEs has very important practical significance.

As used herein, fuzzy comprehensive evaluation method for SME financing efficiency was analyzed and conclusions are as follows: for a healthy and rapid development of SMEs must handle the relationship with commercial banks.

II. THE REVIEW

Fuzzy comprehensive evaluation method is to consider a variety of factors in fuzzy environment, for certain purposes for something to make a comprehensive decision or decision.

SME financing efficiency evaluation is based on small and medium enterprises, in particular the characteristics of the financing of SMEs in china.

Combine the two able to make a comprehensive, nature interpretation and judgment to financing efficiency, improve the accuracy of evaluation：

III. FUZZY COMPREHENSIVE EVALUATION OF ENTERPRISE FINANCING EFFICIENCY

3.1 Establish the factors set

We set all kinds of factors that affect the efficiency of financing is called a factor set, it is an ordinary set with U said:

$$U = \{u_1, u_2, u_3, \Lambda, u_m\}$$

Wherein the u_i representative of factors it, m is the number of factors. These factors often with varying degrees of ambiguity. We selected five factors constitute factor set to evaluate the efficiency of corporate finance： Financing costs; utilization of funds; norms of financing mechanisms; financing body freedom and solvency.

3.2 Establish weight set

In general, the importance of each factor is different, in particular, special consideration important factors, though unimportant factors should be considered, but not very focused. To reflect the importance of each factor, each factor corresponding weights a_i should be assigned to u_i , a_i is usually required to meet:

$$\sum_{i=1}^{m} a_i = 1 \qquad (a_i \geq 0)$$

Thus, by the respective weights together form a fuzzy set?

$$A = \{a_1, a_2, a_3, \Lambda, a_m\} = \{ {}^{a_1}\!/_{u_1}, {}^{a_2}\!/_{u_2}, {}^{a_3}\!/_{u_3}, \Lambda, {}^{a_m}\!/_{u_m} \}$$

A is called weight set，The same factors that if you take different weights, the evaluation result will be different. In order to make the weight distribution is reasonable, we use expert evaluation method. Then after statistics calculated. The results are as follows:

$$A = \{0.30, 0.25, 0.20, 0.15, 0.10\}$$

3.3 Establish alternative set (Evaluation Set)

Alternative set is a collection of the overall results of the evaluation of the evaluation object. Represented by V:

$$V = \{v_1, v_2, \Lambda, v_n\}$$

Wherein v_i represents an evaluation of the results of i , n is the total number of the evaluation results. The Objective of fuzzy evaluation is on the basis of to consider all the factors, then choosing from one of the best alternative focus of the evaluation results. For example the evaluation of the health status, the desirability of alternative collection is:

V = {very good, good, fair, poor}

The evaluation results are to elect one of the most reasonable "physical healths" from V IN. In order to evaluate the efficiency of financing is simple, intuitive, and in this we select only the evaluation results to create two alternative sets:

V = {high, low}

3.4 Single factor fuzzy evaluation

Starting from a single factor was evaluated to determine the set of evaluation object to evaluate the degree of membership of V, called single factor fuzzy evaluation. The evaluation results are available in fuzzy sets representation as follow:

$$R_i = (r_{i1} / (u_i, v_1) + r_{i2} / (u_i, v_2) + \Lambda + r_{in} / (u_i, v_n))$$

R_i Called single factor evaluation that is simplified as:

$$R_i = (r_{i1}, r_{i2}, \Lambda, r_{in})$$

Consider separately evaluating all factors later, you can get the matrix:

$$R = \begin{pmatrix} R_1 \\ R_2 \\ \Lambda \\ R_m \end{pmatrix} = \begin{pmatrix} r_{11} & r_{12} & \Lambda & r_{1n} \\ r_{21} & r_{22} & \Lambda & r_{2n} \\ \Lambda & \Lambda & \Lambda & \Lambda \\ r_{m1} & r_{m2} & \Lambda & r_{mn} \end{pmatrix}$$

R is called a single pixel evaluation matrix, it can be seen as a vague relationship of alternative set V and factors set U. that is a "reasonable relationship" between the factors and evaluation of objects.

Single factor fuzzy evaluation is the key to a comprehensive evaluation, usually single factors fuzzy evaluation is the same as determining the weights, which is carried out through surveys or fuzzy statistical method. Its membership is determined on behalf of the experts think about financing efficiency and its influencing factors impact, but it does not represent the views of this article.

Therefore, this article attempts to compare the three financing methods of analysis to determine the membership of each factor, drawn single factor evaluation matrix to achieve a comprehensive analysis of financing efficiency in comparison process.

IV. FUZZY COMPREHENSIVE EVALUATION OF SEMS ENTERPRISE FINANCING EFFICIENCY

Typically there are three financing companies: namely internal financing, equity financing, and debt financing. Among them, the proportion of internal financing and debt financing larger in SMEs, the key is to compare the two and the equity financing efficiency. Before comparing, it is necessary to explain the membership again. Membership is a digital description for fuzzy index. Next, it will be analyzed separately to determine the factors at different ways of financing level of the factors affecting the degree of membership of the financing efficiency.

4.1 The cost of capital

Efficiency is inversely proportional to the cost of capital and financing, high cost of capital is low financing efficiency. For the cost of capital, the capital cost of equity financing is the highest in the various modes of financing. It is generally accepted by the economy and society. Therefore, we believe that the efficiency of equity financing in the capital cost is the lowest, when you consider the cost of capital, the low efficiency of the equity financing to determine the membership of 1, whereas the high cost of capital equity financing efficiency of the membership set to 0, That no one thought the efficiency of the capital cost of equity financing is high.

Because of tax effects, as compared to debt financing and equity financing is low, but many sources of funding, the cost of capital debt financing is not the lowest, because there are no-cost sources of funding, such as financial grants, donations, etc. and lower financing costs than its internal financing. Therefore, the debt financing membership of high capital cost-effective is 0.6, on the contrary is 0.4.

Internal financing companies will own profits into accumulation, Marx's words, that is, "the capital of surplus value." On the surface this financing does not need to pay the price, no cost, but in fact there are costs. Such as the opportunity costs: corporate profits before conversion into capital, it can be used as capital to enter the market determined value. Give up this opportunity to add value and tax cost is the opportunity cost of internal financing; and some foreign countries, the introduction of a capital gains tax and net worth tax, when profits into capital or capital increase relates to changes in net worth and income of the sale of capital assets time, they will have to increase both taxes.

Founded and put into operation in stages internal financing SMEs predominate, while growth in the mature stage of development and also because of financial bottlenecks internal financing as the main source of funding for SMEs. Therefore, we will affect each financing cost of capital financing efficiency level of membership is determined as follows:

Capital costs affect the efficiency of the financing level membership	high	low
Equity financing	1	1
Debt Financing	0.6	0.4
Debt Financing	0.8	0

4.2 Utilization of funds

From the capital utilization efficiency financing aspects to consider, there are two aspects.

One the one hand is the capital in-position rate. Among three financing method, internal financing has the highest capital in-position rate, as long as the company makers made the decision, corporate profits will remain in-house, this is no obstacle. The capital in-position rate of the equity financing and debt financing almost, there will has the risk of being insufficient to raise capital, subscribed bonds or loans funds are not in place. It's all recurring phenomenon in the Chinese A-share market, bond market, the financial markets.

The second aspect is to invest funds. There are some issues in equity financing of funds to invest. Many new listed companies at a premium offering to raise a lot of money, but do not know how to use. Especially SMEs, there are both listed on difficult issues, finally listed, but also because the funds management and appropriate measures cannot keep up, funds investment unaccounted for, long-term storage in the bank cause severe precipitation. The debt financing is a little better in this regard. Because debt financing, including bank loans and issue bonds.

Considering the above two aspects, the level of utilization of funds were: internal financing> debt financing> equity financing, therefore, when considering only the utilization of funds, the possibility of financing efficiency level distribution (membership) should be as follow:

Capital costs affect the efficiency of the financing level membership	high	low
Equity financing	0.4	0.6
Debt Financing	0.6	0.4
Debt Financing	0.8	0.2

4.3 Specification of financing mechanisms

Specification of financing mechanisms may also be said to be the maturity of the capital market. Mechanisms regulate of capital markets have many financing channels, small risk, financing also high efficiency. Overall, China's capital market is still in an immature state. Specifically, the late development of the securities market, listed companies less, not very standardized operation of listed companies. That less likely to meet the financing needs of SMEs. Both past and present, most SMEs rely on bank loans to solve the funding problem.

Thus, compared to the financial system as the main debt financing, the mechanism norms of equity financing, the development of history is short, low mechanism specification degrees.

Therefore, considering the norms of financing mechanisms, financing efficiency in descending order: debt financing> equity financing> internal financing. Determine the financing mechanism to consider financing norms financing efficiency level of membership according to this order:

Capital costs affect the efficiency of the financing level membership	high	low
Equity financing	0.3	0.7
Debt Financing	0.6	0.4
Debt Financing	0.2	0.8

4.4 Freedom of financing subject

Financing subject freedom refers to the degree of financing subject constrained, the constraints include legal, and institutional regulations, the regulations and the systems. In our country, the internal financing from outside constraint degree is smaller, Equity financing subject only the restriction of the shareholder vote with their feet, dominate the extent of the funds raised are larger.

Although our country's corporation law and the relevant securities laws of the listed company have specific provision to raise funds. But in fact, the board of directors of the listed companies is free to change money, as long as the timely disclosure.

Order of the financing efficiency considering the financing subject freedom, as follows: internal financing > creditor's rights financing > equity financing. That determines the membership of each financing efficiency level.

Capital costs affect the efficiency of the financing level membership	high	low
Equity financing	0.6	0.4
Debt Financing	0.4	0.6
Debt Financing	0.8	0.2

4.5 Solvency

For liquidity, the equity financing since no repayment of principal, so it will not produce a variety of risks and adverse effects arising from debt because they cannot repay generated. Therefore, when considering that the solvency, the financing efficiency of equity financing is to determine high, the corresponding membership set at 1. Well, think of its low efficiency membership is naturally 0.

At this point, internal financing and equity financing has the same property that does not need to repay the principal. As for the debt financing, the risk of various adverse factors that are unable to repay and the negative factors are all caused by the debt financing. These risks and negative factors will lead to a decrease in efficiency financing. The extent of this financing efficiency decrease, different enterprises have different results.

Consider solvency funding through the above analysis, to determine the membership of each financing as follows:

Capital costs affect the efficiency of the financing level membership	high	low
Equity financing	1	0
Debt Financing	0.2	0.8
Debt Financing	1	0

The analysis impact of financing efficiency based on each of the above factors. We can determine the membership of SMEs in various financing ways.

factor	Equity financing efficiency		Debt financing efficiency		Internal financing efficiency	
Membership	High	Low	High	Low	High	Low
Financing the cost of capital	0	1	0.6	0.4	0.8	0.2
Utilization of funds	0.4	0.6	0.6	0.4	0.8	0.2
Specification of financing mechanisms	0.3	0.7	0.6	0.4	0.2	0.8
Freedom of financing subject	0.6	0.4	0.4	0.6	0.8	0.2
Solvency	1	0	0.2	0.8	1	0

VI. CONCLUSIONS

(1) For the equity financing, based on the largest membership, Inefficient membership is high than efficiency membership, the efficiency of the equity financing for SMEs can be evaluated is relatively low. According to the principles of fuzzy distribution, high efficiency of the membership of equity financing is 0.35, can further explain a 35% certainty, said high efficiency financing equity financing, whereas 65% certainty say inefficient equity financing. Similarly, the higher the efficiency of debt financing for SMEs, 53% sure think so. The SME financing is the most efficient internal financing, because there is 70 percent certainty that the efficiency of internal financing for SMEs is high.

(2) According to the principle of maximum membership, financing debt financing and internal financing efficiency is high. According to the principles of fuzzy distribution, high efficiency of each mode of financing the membership order is 70> 53> 35, so you can get a variety of financing to SMEs, the internal financing efficiency> debt financing efficiency> equity financing efficiency.

For any of SMEs, due to the limitation of production scale, its internal financing capability is very limited, therefore, to improve the efficiency of its financing, we must pay attention to debt financing and equity financing. For debt financing, the market economy system, the largest creditor of the issuer than commercial banks; for equity financing, the commercial bank also plays an important role. Therefore, SMEs should healthy and rapid development; we must deal with reasonably good relationship between banks and commercial banks.

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