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Financing Efficiency of China's New Energy Industry Based on DEA Model and Its Influencing Factors

Haiyan SUN[1], Chengxuan GENG[2]

Abstract

The development of new energy relates to the success or failure of China's energy structure adjustment, relates to the guarantee of energy security, and relates to the improvement of the country's overall national strength. It has important strategic significance. However, with the rapid development of the new energy industry, financing difficulties have gradually become a major problem constraining its continued healthy development. This paper firstly sorts out the financing-related basic theory, and adopts a quantitative analysis method combining DEA data envelopment analysis method with multiple regression analysis method to realize the evaluation of the overall financing efficiency level of the new energy industry and the analysis of the factors affecting the specific financing efficiency; Based on the qualitative and quantitative analysis conclusions, the policy recommendations for improving the financing efficiency of the new energy industry are proposed.

Keywords: new energy, financing efficiency, DEA, social impact, development.

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Introduction

The value of energy is ultimately the result of economic development. In the case of non-renewable fossil fuels being flooded, traditional energy sources have become less and less, and prices have been rising. Using this type of energy will also produce a series of Environmental Pollution. Energy utilization and environmental issues are in serious conflict. In order to evade this vicious conflict, the intervention of new energy is needed. The comprehensive advantages of new energy are also a key factor in ensuring rapid economic development. This determines whether China's overall national strength will be improved. Whether the entire economic development system can be further optimized. However, at present, most of the domestic new energy companies are still in the development stage, especially the huge amount of financial investment, which is still an important part of the development of the enterprise. Therefore, the research on financing in new energy companies has become a hot topic in the academic community. The study of issues has been recognized by the academic community and the financial community as a new area of research in the financial industry. It can complement and complement the theoretical research work. Based on the empirical analysis of the financing efficiency of China's listed new energy companies, this paper quantitatively studies the financing efficiency, statistically analyzes the financing efficiency of new energy companies, starts from the data, analyzes the root causes, and summarizes the corresponding solutions. In addition, regarding the selection of research objects, this paper selects new energy companies in major cities such as Shanghai and Shenzhen, and is located in the first-tier cities. The scale of the economy is large, and the development of new energy sources is relatively good. It is well represented. Analysis and demonstration of these new energy companies' financing problems can better understand the financing efficiency of the entire industry. Therefore, studying the financing efficiency of new energy companies can achieve a reduction in financing risks and costs, and can promote the rapid development of enterprises.

Literature review

The financing efficiency has a direct relationship with the financing structure of the company. So far, there is no good empirical research to examine the choice of corporate financing structure. Most empirical studies use data from developed countries, especially Europe and the United States, to test different theoretical models or find some general patterns. Titman and Wessels (1988) creatively introduced factor-analysis techniques to predict the impact of some unobserved attribute variables on the company's debt ratio. They conclude that transaction costs may be an important factor influencing the choice of financing structure. Booth et al. (2010) calculated the latest data from a number of emerging market countries,

and concluded that the capital structure in these countries is basically the same as the developed countries, but the effect of variables in different countries may be exactly the opposite; The effect is more significant and the overall effect is worse. Guney, Li, & Fairchild (2011) analyzed the relationship between product market competition and the financing structure of Chinese listed companies through a series of static and dynamic data. Specifically, the impact of financial support on the development of strategic emerging industries, Dee and Minshall (2011) found that the financing of enterprises and the rise of the industry are not simple relations, and it cannot be judged that the more financing, the more emerging industries there will be. Simon, Bumpus, & Mann (2010) found through case studies in Peru and other countries that carbon financing promoted and supported by the government can have a win-win effect. On the one hand, energy-saving technologies can be developed, and on the other hand, greenhouse gas emissions can be reduced. Lewis and Wiser (2005) found that the Clean Development Mechanism (CDM) provides financial support for the development of renewable energy in China, and critics believe that China cannot rely solely on the financial support of developed countries to achieve the development of renewable energy technologies. The government should also provide sufficient financial resources to develop renewable energy technologies. The above foreign research results show that different capital structures and different financing structures have different effects on the development of companies and industries. As to the effect of this effect, domestic scholars generally use the DEA model to conduct empirical research.

The earliest domestic study on issues relating to corporate financing efficiency was Zeng (1993), who conducted specific research on direct financing and indirect financing channels. The earliest definition of the concept of "financing efficiency" was defined in "How to Treat Direct and Indirect Financing". From the seven factors affecting the efficiency of financing and financing costs, the normative analysis method was used to compare the financing efficiency and cost of the two financing methods. However, Professor Zeng did not explicitly give the concept of financing efficiency. Song (1998) studied the concept of "financing efficiency" earlier. He compared "financing efficiency of stock financing and bank lending" and pointed out that the concept of economic efficiency refers to the relationship between cost and benefit. As an institutional arrangement, the financing method includes two aspects: transaction efficiency and allocation efficiency. The former refers to the ability of such financing methods to provide investors with financial resources at the lowest cost. The latter refers to its ability to allocate the capital of scarce resources to investors for optimal "productive" use, which is equivalent to the functional efficiency of Tobin. However, the concept of "financing efficiency" is not clearly defined.

Ye (1999) defined the financing efficiency as a set of financing risks, financing ease, and financing risks. Later, Gao (2000) defined corporate financing efficiency as the level of corporate financing and the level of cost. Lu & Yan (2003)based

on the theory of neoclassical economics, believes that corporate finance efficiency is determined by the degree to which financing activity costs, financing income, and financing risks affect the value of the firm as a whole. Cui, Hu, & Zhang (2014) studied the impact of the financing efficiency factors of domestic non-listed SMEs on the development of enterprises. When the main business of the company fluctuates greatly, it directly affects the effectiveness of corporate finance, short-term debt capability, profitability, debt repayment ability and profitability. Corporate finance has less impact. Wei (2001) proposed five factors affecting SMEs: financing costs, utilization of funds, ability to repay debts, adjustment of differences in financing entities, and freedom of financing institutions. After the method of fuzzy analysis, he compared the three financing channels, and obtained evaluation indicators, and finally evaluated the impact of these factors on the financing efficiency of the company. According to the author's conclusion, he believes that among the three financing methods, the highest financing efficiency is internal financing, followed by debt financing efficiency, and the lowest financing efficiency is equity financing.

The focus of the analysis on the impact of financing efficiency is on the company's financing structure, cost factors, and macro-market research. Many scholars have pointed out that the impact of financing channels is reflected in: financing channels will affect the company's governance structure, thus affecting the company's financing efficiency, and then affect the company's financing efficiency; the use of funds is affected. Lu (2000) pointed out that financing efficiency refers to the ability and effectiveness of a certain financing method or financing system in the process of realizing savings and investment transformation, and constructs an analysis system of financing efficiency, and puts forward the enterprise from the micro and macro perspectives. Financing efficiency is analyzed . Liu (2002) pointed out that the financing process of a company is essentially a kind of resource allocation process in the form of capital supply and demand from the perspective of profitability of funds, and the profitability of funds makes it flow to higher-return companies. It can be seen that the capital integration channel and scale can represent the allocation efficiency of funds to some extent. Whether the funds can be obtained or not, the size of the company's investment through which funds are included and the amount of funds to be incorporated have a direct impact on the financing efficiency. Ren (2007) thought that the financing decision is to analyze the most suitable financing combination, constitute an effective check and balance mechanism, and constrain the agent's behavior. The agent is the work that can achieve the goal of maximizing the profit of the company to ensure the efficient use of funds. The financing cost of an enterprise refers to the price paid for obtaining the right to use capital during the fund raising process. Chen (2005) adopted an empirical analysis. The results show that the cost of equity financing for Chinese listed companies is lower than the minimum for bond financing and bank borrowing. The preference of companies for equity financing is rational, which conflicts with the order of Chinese financing. In the financing process,

the cost of the comparison of various financing channels is adopted, and the financing method corresponding to the lowest cost is finally selected to improve the efficiency of financing.

Therefore, it is known that all of the above existing theories have theories that there are currently studies on the field of corporate finance efficiency in China. However, lack of research on the financing of the industry, especially the lack of research on new energy financing issues, there are only qualitative studies lacking quantitative analysis. This article starting from the new energy industry, a comprehensive overview of the new energy companies financing history and status quo, through quantitative empirical research, in-depth understanding of the new energy companies financing efficiency issues, through relevant arguments to explore and upgrade the financing efficiency of the new energy industry.

Empirical analysis

Method selection

The DEA method, also known as Data Envelopment Analysis, was proposed by Farrell (1957) and Charnes (1978) to describe what is a mathematical planning method based on production frontiers and the efficiency measurement of the construction boundary. The DEA method is a non-parametric, multi-factor productivity analysis tool that can estimate the relative effectiveness of multiple inputs and multiple outputs. The DEA method is a non-parametric method, which does not require pre-estimation of parameters, nor does it need to establish a functional relationship between the explanatory variables and the dependent variables, thereby avoiding the inadequacy of adopting wrong functional forms to draw wrong conclusions. In economics, the DEA method is often used as a solution to cost, profit, and profit problems. It is also used to search for distributional effectiveness and to estimate technological and productivity advancement. The DEA method is used to study the financing efficiency of the new energy industry. The DEA analysis method is evaluated from the point of view that is most conducive to the decision-making unit (DMU). It emphasizes the optimization of the elements of each decision unit and can indicate the adjustment direction of the related metrics. Therefore, this paper uses the DEA principle to construct an analysis model for the financing efficiency of listed companies in China's new energy industry. Through an empirical analysis of the financing efficiency of listed companies in China's new energy industry, we will develop a strategy that will help improve the financing efficiency of Chinese new energy industry listed companies.

The DEA model refers to the "unit" or "department" to be evaluated as the DMU, and each

$$X_j = (x_{1j}, x_{2j}, \cdots, x_{rj})$$

$U_{DM_j}(j = 1,2,3,\cdots,n)$

has r term inputs.and s term output.

and s term output, $\mathbf{Y}_j = (y_{1j}, y_{2j}, \cdots, y_{sj})^T$, where x_{mj} represents the mth type of input of the jth U_{DM_j} The quantity, y_{lj} denotes the input quantity of the jth U_{DM_j}, $x_{mj} > 0$, $y_{lj} > 0$ $x_{mj} > 0$, $y_{lj} > 0$,m=1,2,3…,r,l=1,2,…,s。. The construction model is as follows:

$\min\theta_i$:

$$\sum_{j=1}^{n} \lambda_j X_j + s^- = \theta_i X_i \quad \sum_{j=1}^{n} \lambda_j X_j + s^- = \theta_i X_i \quad \text{,i=1,2,…,n,}$$

$$\sum_{j=1}^{n} \lambda_j X_j - s^+ = Y_i \quad \sum_{j=1}^{n} \lambda_j X_j - s^+ = Y_i \quad \text{,i=1,2,…,n,}$$

s.t.

$\lambda_j \geq 0$ $\lambda_j \geq 0$ ^^D_Dd___

$s^+ \geq 0$, $s^- \geq 0$

Where θ_i is the effective value of U_{DM_j}, and the closer the effective value is to 1, the more effective the input of this DMU is. The validity judgment method is: if θ_i=1, U_{DM_j} U_{DM_j} is called valid or weak effective for DEA. When $s^+ = s^- = 0$ $s^+ = s^- = 0$ is called DEA is valid; if θ_i <1, then U_{DM_j} is invalid for weak DEA. The input data slack variable is s^-, and s^- represents an input surplus, that is, an unused resource. If s^- ≠0 indicates that the output is unchanged, the input can also reduce s^-; the output slack variable For s^+, s^+ means that there is insufficient output, and s^- ≠0 means that if the input is constant, the output can also increase.

Therefore, if a DMU is not valid, DEA can be effectively adjusted by not writing input and output indicators.

Assuming a fixed output level, the input variable is adjusted to: $\overline{X_i} = \theta_i X_i - s^-$; if Assuming a fixed input level, the output variable is adjusted to $\overline{Y_i} = Y_i + s^+$.

For the traditional DEA model, in the process of analyzing the eco-efficiency of tourism, multiple DEAs may be effective. At this time, their comprehensive technical efficiency index is θ=1, which makes it impossible to further evaluate the effective DEA of DEA. Therefore, the use of a super-efficiency model allows for a more in-depth production efficiency ranking of all DEA effective decision making units. When calculating the super-efficiency value of the DEA effective decision unit K, the principle is to exclude the DMUk from the model, and replace the input and output of the DMUk by the input-output linear combination of other decision units. The result of the solution is the decision unit. K's super-efficiency value, due to the backward movement of its production frontier, the measured effective unit efficiency value is often greater than the traditional model's efficiency value1, and the corresponding super-efficiency values of different DEA effective decision-making units are different. Make DEA effective decision-making unit has the characteristics of ecological efficiency comparability. Anderson and Peterson (1993) established an investment-oriented hyper-efficiency DEA model to compensate for this deficiency, and can make effective decision-making units with efficiency values greater than one. The super-efficient DEA (SE-DEA) model is as follows.

$$\min\left[\theta-\varepsilon\left(\sum_{i=1}^{m}s_i^-+\sum_{r=1}^{s}s_r^+\right)\right]$$

$$\sum_{\substack{j=1\\ j\neq k}}^{n}\lambda_j X_{ij}+s^-\leq\theta X_0$$

$$\sum_{\substack{j=1\\ j\neq k}}^{n}\lambda_j Y_j-s^+=Y_0$$

$$\lambda_j\geq 0 \quad \wedge\wedge \quad s^+\geq 0;\ s^-\geq 0$$

Among them, λ is the weight variable of DMU, θ is the parameter to be determined, slack variable s_r^+ , s_r^-, X is the input quantity, and Y is the output quantity. The solution to the model is denoted by θ^*. If θ^* <1, it indicates that there is a virtual decision unit whose output is not lower than the output of the first j_0 decision unit, and the input ratio is the input of the j_0 decision units. Below, this shows that j_0 is non-DEA valid. If θ^* =1 and the slack variables are all 0, then the j_0 decision unit is DEA valid; and θ^* <1 but the slack variable is not 0, the j_0 decision unit is valid for weak DEA.

Indicator selection and data sources

When using the DEA method for data simulation and econometric analysis, the sample selection determines the DMU (decision making unit), and the selection of the DMU (decision making unit) is actually the determination of a comparison set of references. The use of the DEA method to analyze the financing efficiency requires the determination of input and output indicators, which can be selected through the production method and the asset law. Taking into account the industrial characteristics of the listed companies in the new energy industry, the following variables were finally determined:

(1) Input-level indicators

Total cost of main business. The total cost of the main business is used to measure the consideration that the power and energy companies must pay when

they sell products and services that are closely related to the main business. This indicator reflects the resources consumed by the listed company for its main business activities and is expressed in currency. The cost of the main business is directly related to the profit of the company. The lower the cost control, the higher the profit the company obtains. The cost of the main business reflects the ability of the company to use the funds it integrates.

Intangible asset growth rate. It refers to the ratio of the growth of intangible assets at the end of the appraisal period compared to the end of the previous period. The operation of intangible assets is a way of asset operation. For the development of new energy companies, the intangible assets that cover technology patents are also one of nuclear power and competitiveness. It is an important aspect.

Asset-liability ratio. The asset-liability ratio is the percentage of total liabilities as a percentage of total assets. It reflects the response of financing efficiency to capital structure. It is an indicator for evaluating the level of debt and solvency of a company, and it can also initially determine the risks the company faces. In practice, it is generally limited to 50-70%. Selecting this indicator helps measure the effect of debt financing on business performance.

Equity financing ratio. The equity financing ratio is represented by the equity of the parent company's shareholders divided by the total investment capital, which reflects the scale of the funds raised by the listed company's equity financing.

(2) Indicators at the output level

Main business income growth rate. The indicators at the output level can reflect whether the funds raised by the company through equity financing and credit financing channels are used for the company's main business, and also reflect the operating efficiency, growth ability, and growth of the listed company. At the stage, less than 5% indicates that the company's development stage is in recession; 5%-10% is the range of stable period; if it is higher than 10%, it is high-speed growth period.

Return on net assets. The indicator at the output level is the ratio of the company's net profit to the average shareholder's equity, also known as the owner's equity rate of return. This indicator can be used to measure the efficiency of the company's use of its own capital to obtain revenue, reflecting the profitability of listed companies after equity financing. The higher the value, the more bureaucratic the investment obtained through financing, and the more efficient the financing.

Earnings per share. The indicator at the output level refers to the ratio of the company's total profit after taxation to the total share capital of the company, which can reflect the degree of influence of the company's board of directors and management's financing decisions on the company's earnings per share. This indicator is not affected by stock price volatility and can reflect the return on the company's annual operating results to shareholders. According to the statistical rule of thumb, in the actual use of the DEA method to measure relative efficiencies,

the number of samples required for a decision unit is at least twice the product of the number of inputs and outputs or more than twice the sum of the number of input and output indicators.

Data sources

This chapter measures and analyzes the financing efficiency of China's new energy industry through empirical methods. However, due to the fact that the entire new energy industry's relevant data has not been completely collected, China's new energy listed companies have been listed as examples for empirical research. The company focuses on representing a company with a high level of strength in the entire industry, and its behavior model is representative of the industry. In addition, as many as 100 companies involved in the concept of new energy industries, but not every company is focused on the production of new energy products, and some companies are only just entering the new energy industry, but its main business is still its traditional In the main business, some enterprises have transformed from traditional enterprises into new energy industries after reorganization. The new energy project business has not yet been commercialized, and it has failed to bring profitable contributions. Therefore, new energy-related products or services are selected to reach more than 30%, or have all The listed company of the wholly-owned subsidiary of the company, which specializes in new energy business, is the research object. This paper selects 42 new energy listed companies during the period of 2010-2017, including enterprises with mid-stream equipment manufacturing or downstream power generation that have more obvious new energy characteristics in the four sub-industries of wind power, solar energy, biomass energy, and nuclear power nuclear power, eliminating ST and ST*'s stocks, which exclude stocks with missing data, exclude stocks whose operating income accounts for less than 30% of new energy business income. The classification criteria is the classification of the concept stocks in the wind information database, combined with the main business scope disclosed in the company's annual report.

Calculation Results of Financing Efficiency of New Energy Industry

By using DEAP 2.1 software, the input indicators and output indicators that are determined are substituted into the model, and relevant results can be obtained. The input indicators are obtained based on the financial data of the listed companies at the end of the year. The output indicators are the average of the relevant data of the financial statements from 2010 to 2017. Through software operations, the results are shown in Table 1.

Table 1. Calculation result

Firm	Comprehensive efficiency (CE)	Technical efficiency (TE)	Scale efficiency (SE)
ZHEJIANG YANKON GROUP CO.,LTD	0.568	0.912	0.632
GD POWER DEVELOPMENT CO.,LTD	0.451	0.325	0.213
HONGBAOLI GROUP CORPORATION, LTD.	0.325	0.556	0.369
FAW CAR CO.,Ltd.	1.235	1.234	1.258
ZHENGZHOU YUTONG BUS CO.,LTD.	1.023	1.115	1.225
Henan Yicheng New Energy Co., Ltd.	0.365	0.326	0.225
NINGBO SHANSHAN CO.,LTD.	0.639	0.552	0.362
Sichuan Minjiang Hydropower co.,ltd	0.221	0.126	0.778
Sinoma Science & Technology Co.,Ltd.	0.332	0.552	0.556
Hengdian Group DMEGC Magnetics Co. ,Ltd	0.658	0.369	0.332
NINGBO YUNSHENG CO.,LTD.	1.032	0.998	0.112
Sichuan Xichang Electric Power Co.,Ltd.	0.221	0.115	0.558
CHINABAOAN GROUP CO., LTD.	0.963	0.789	0.996
ZHEJIANG HUAYOU COBALT CO., LTD	1.896	1.968	0.998
Ning Xia Yin Xing Energy Co.,Ltd	1.235	1.115	1.123
INNUOVO TECHNOLOGY CO.,LTD.	0.693	0.663	0.885
China Yangtze Power Co.,Ltd.	0.339	0.225	0.115
Huaneng Power International,Inc.	0.263	0.223	0.336
AUCMA Co.,Ltd.	0.125	0.852	0.556
China Northern Rare Earth (Group) High-Tech Co.,Ltd	0.996	0.669	0.228
COFCO BIOCHEMICAL(ANHUI) CO., LTD.	0.879	0.963	0.993
TBEA CO., LTD.	0.963	0.225	0.886
Datang International Power Generation Co.,Ltd.	0.885	0.123	0.556
HUAYI ELECTRIC COMPANY LIMITED	0.336	0.141	0.335
SANAN OPTOELECTRONICS CO.,LTD	0.996	0.556	0.336

TIANJIN ZHONGHUAN SEMICONDUCTOR CO.,LTD.	0.225	0.963	0.996
China Spacesat Co.,Ltd.	0.897	0.856	0.553
JiLin Sino-Microelectronics Co.,Ltd.	1.635	0.658	0.448
SANY HEAVY INDUSTRY CO.,LTD	0.932	0.336	0.996
WanxiangDoneed Co.,ltd	0.882	0.223	0.375
CSG Holding Co., Ltd.	0.993	0.158	1.025
Shenzhen Desay Battery Technology Co., Ltd.	0.665	0.885	0.996
Shandong Jinjing Science & Technology Stock Co. Ltd	0.326	0.965	0.663
WANXIANG QIANCHAO CO.,LTD.	0.893	0.556	0.852
CRRC Corporation Limited	1.025	0.337	0.991
Jiangsu Akcome Science & Technology Co.,Ltd.	0.225	0.792	0.881
Wuxi Little Swan Company Limited	0.669	0.782	0.852
Chongqing Changan Automobile Company Limited	1.025	0.445	0.365
JIANGSU GUOTAI INTERNATIONAL GROUP GUOMAO CO. LTD.	0.996	0.225	0.558
Lushang Property Co.,Ltd.	0.258	0.964	0.953
XIAMEN KING LONG MOTOR GROUP CO.,LTD.	0.336	0.442	0.225
XINJIANG GOLDWIND SCIENCE&TECHNOLOGY CO.,LTD	0.993	0.335	0.335

Overall analysis of financing efficiency

According to the calculation results of the financing efficiency of China's new energy industry companies, the overall analysis of the financing efficiency of new energy industry enterprises is shown in the table below.

Table 2. Overall Financing Efficiency of 42 Listed Companies in China's New Energy Industry in 2016

firm	TE		SE	
	Effective number	The proportion	Effective number	The proportion
effective	10	23.81%	25	59.53%
invalid	32	76.19%	17	40.47%

From the above table, we can see that the effective ratio of financing efficiency of China's new energy industry companies is not high. In the 2016 fiscal year, 10 companies in 42 new energy industry enterprises are both technically effective and effective, accounting for 23.81% of the selected enterprises, and non-effective enterprises accounting for 76.19%. Under the DEA financing efficiency model, non-effective listed companies can examine their pure technology effectiveness and scale effectiveness. The calculation shows that among the 42 new energy industry companies, 25 companies with non-technical and effective scale are accounting for 56.53% of the selected enterprises. In other words, under the existing scale conditions, these listed companies are unlikely to reduce their investment if they want to keep the current output unchanged. The other 17 listed companies in the new energy industry are neither technically efficient nor scale-effective, that is, even if they reduce some of their inputs, they may maintain the current output level unchanged. It can be seen that the overall financing efficiency of China's new energy industry is relatively low, and in order to raise its level of financing efficiency, it is necessary to analyze the factors that affect the efficiency of financing.

Analysis of Factors Affecting the Financing Efficiency of China's New Energy Industry

Under the background of China's current economic development, China's financial system and financing market are still not perfect compared with Western developed countries, relevant laws and regulations are not yet perfect, and the reasons for the lack of development of the enterprise itself, so the problem of financing efficiency of enterprises should be worth It is particularly concerned that it cannot be one of the bottlenecks in curbing the development of China's new energy industry. While analyzing its financing efficiency, it is necessary to pay attention to the factors affecting its financing efficiency, so as to provide better solutions to improve the financing efficiency of China's new energy industry. In this section, we analyze the influencing factors of China's new energy industry financing efficiency and establish a panel data model to empirically analyze the influencing factors of China's new energy industry.

Variable selection

This paper selects comprehensive efficiency as an indicator to measure the financing efficiency of China's new energy industry companies. The reason why we chose to use comprehensive efficiency rather than technical efficiency and scale efficiency is because overall efficiency is a better indicator when measuring the financing efficiency of listed companies than the latter two indicators, and the variable returns to scale are taken into account in the calculation. The factor is

that even if the overall efficiency is obtained through the established model, using the index as the dependent variable of the model will produce a better effect on the regression of the model.

On the basis of the foregoing analysis, we will quantify the factors affecting the financing efficiency of China's new energy industry companies. This article selects the total assets to represent the scale of development of new energy industry enterprises, and selects the asset-liability ratio (total assets total liabilities) to represent the financing structure of new energy industry companies. The selection (current liabilities/liabilities) represents the debt financing structure of the new energy industry and reflects the quality of financing. Select operating cost profit margin (total profit operating costs) to reflect the use of new energy industry funds.

Model Construction

In the sample selection, 42 new energy industries selected based on the above research basis were listed, taking into account the new energy industry as the identification and development of China's strategic emerging industries. According to the previous analysis, a multiple linear regression model is constructed as follows:

$$CE_{it} = \alpha_0 + \alpha_1 SIZE_{it} + \alpha_2 DA_{it} + \alpha_3 CLR_{it} + \alpha_4 SPRC_{it} + \mu_{it}$$

Among them, i represents the ith new energy industry listed company, t represents the year. CE expresses the comprehensive efficiency, which is used to represent the financing efficiency of the new energy industry. The value of this variable is calculated using software in the former empirical part.

SIZE is the total assets, representing the scale of development of the new energy industry.

DA is total debt/total assets and represents the financing structure of the new energy industry.

The CLR is the total current liabilities/debt, representing the debt financing structure of the new energy industry and reflecting the quality of financing.

SPRC is the operating cost profit rate, ie total profit/operating cost, which reflects the use of funds by new energy industry enterprises.

Regression analysis

Through the use of software, multiple regression analysis of the model results are as follows:

Table 3. Regression results

variable	coefficient	P value
C	0.3365	0.0063
SIZE	0.0125	0.0432
DA	0.0169	0.0321
CLR	0.6632	0.0023
SPRC	0.4236	0.0014
R^2	0.9963	
Log likelihood	22.369	

As can be seen in the above *table*, R2 is, indicating that the overall linearity of the model is good, the degree of fit is high, and the values of the various variables have also passed the test. The set of independent variables has a significant impact on the dependent variable financing efficiency.

(1) *Impact of Firm Size on Financing Efficiency*. The scale of corporate assets is significantly positively correlated with financing efficiency. In the regression results, the impact coefficient of the company scale is 0.0125. Although the impact coefficient is not large, the regression results show that it is positively related to the financing efficiency, indicating that the larger companies have smaller scale in the financing. The companies have more advantages, and are more mature in the use of funds management, and their financing efficiency is also high.

(2) *Effect of asset-liability ratio on financing efficiency*. The asset-liability ratio of enterprises is significantly positively correlated with financing efficiency. This result is different from previous studies of asset-liability ratios and corporate financing efficiency by many scholars. It is mainly due to the differences between new energy industries and general enterprises, and it has been affected in recent years. The government's strong support, this article from another point of view, that the more companies with the ability to develop can absorb more debt funds to meet its development, the coefficient of influence of the debt ratio is 0.0169, although the impact coefficient is small, indeed Shows the positive relationship between asset-liability ratio and corporate financing efficiency.

(3) *Effect of Enterprise Quality on Financing Efficiency*. This article uses the current liabilities/liabilities as a whole to represent the debt financing structure of the new energy industry and reflects the quality of financing. Enterprises with good quality tend to use short-term financing methods. Enterprises with poor quality tend to use long-term financing methods. In the regression results, the total of current liabilities/liabilities is positively correlated with the financing efficiency,

with an influence coefficient of 0.6632. This coefficient of influence is the largest among the four impact indicators and companies with good quality and ability to develop can absorb more liquidity.

(4) *Effect of operating cost profitability on financing efficiency*. The operating cost profitability is significantly related to the financing efficiency of the company. The operating cost profit rate is expressed in terms of total profit/operating cost, reflecting the use of funds by new energy industry companies. The operating cost profit reflects the company's development prospects and profitability to some extent. In the regression results, the coefficient of influence was 0.4236, and the significance passed the test.

Suggestions

Improve the internal financial system.

Due to the characteristics of the new energy industry, no matter whether it is technology research and development, investment construction, or enterprise operation, it needs a lot of funds to support it. However, the long return period for new energy projects has resulted in higher financial risks for new energy companies. In contrast, private enterprises in the new energy industry accounted for more than half of the total. Some companies have incomplete internal financial systems, unreasonable financing structures, and inadequate internal control and decision-making systems. As a result, some enterprises have made mistakes in decision-making, blind expansions, and companies have suffered losses. Only by establishing a sound corporate internal financial system can companies be able to survive in a competitive market and be able to operate scientifically. For new energy listed companies, they choose the optimal financing method, optimize the ownership structure of the company, increase the proportion of tradable shares, reduce the proportion of state-owned shares, increase the number of legal person holding shares, and avoid one dominance. The establishment of a good shareholder-oriented management mechanism enables the company's management to make scientific decisions, improve the company's operating capabilities, and increase company value.

Government policy funding support

The new energy industry is an industry that relies on the government's strong support. The government's support for the new energy industry is reflected in: First, policy support, the introduction of relevant policies and regulations, and the implementation of favorable monetary and fiscal policies for the development of new energy industries, such as Interest-free loans or subsidies for new energy companies. The second is financial support. The state provides financial support

for the new energy industry. It can directly inject funds for scientific research and technology development into the enterprise. It can also create funds for new energy companies so that new energy companies can obtain state capital subsidies. Through the government's policy financial support, new energy companies can achieve faster and better development.

The introduction of private capital

For the state-controlled monopolized new energy entity, the introduction of private capital is an important means to improve the market mechanism and improve the competitiveness of the entity market. For private energy-based new energy entities, the introduction of private capital is an important financial support for the company's continuing operations. The introduction of private capital by private and small- and medium-sized micro-enterprises in the new energy industry is mainly focused on short-term capital turnover. It is often adopted through pension funds, treasure chest companies, funds and private equity in venture capital, or through project financing companies. The company itself looks for private finance. At present, private capital has dominated in the areas of small hydropower, solar thermal utilization, crystal silicon, and wind power equipment manufacturing. The installed capacity of wind power has accounted for 15% of the country's total installed capacity, and wind power equipment production capacity has accounted for 50% of the country's total; as of May 2014, it has entered The private capital of the new energy industry has exceeded 1.3 trillion. It can be seen that the effective introduction of private capital has played an important role in expanding the financing channels, reducing the financing costs, and improving the financing efficiency of China's new energy industry.

Innovate financial products and comprehensively improve the financing service system

At present, the size of China's new energy companies is mainly small and medium-sized. Low credit, poor efficiency, insufficient guarantees, and troublesome repayment sources and capabilities are common problems. It is difficult to obtain loans from commercial banks. Therefore, in order to improve the financing structure of these enterprises, improve their credit rating, and alleviate their indirect financing difficulties, it is necessary to establish a credit guarantee system for SMEs. The company has good prospects for development, good economic benefits and conforms to national industrial policies. It can be used as a key business target for credit guarantee companies. For such new energy companies, the credit guarantee company should explore its business model, and design the characteristic guarantee financing products accordingly. In terms of risk control, based on the characteristics of new energy companies, an appropriate security review system has been established, and anti-guarantee control measures such

as the pledge of real estate and the pledge of intellectual property rights have been used to link guarantees with investments to effectively resolve information asymmetry. On the other hand, it can stimulate the growth potential of the new energy industry, promote the development and expansion of enterprises, and provide more financing support based on the gradual increase in their collateral.

When commercial bank concerns are most concerned about the improvement of mortgage guarantees, commercial banks and other financial institutions should take off colored glasses, increase credit input to new energy companies, give preferential priority to new energy companies in line with support policies, and provide provincial insurance loans, etc. The relevant preferential policies not only ease the financing situation of new energy companies, but also comply with the commercial bank's own risk control criteria. In addition, the current credit products of commercial banks are not suitable for new energy companies. Targeted innovative products need to be urgently developed and innovations need to be strengthened. For example, the establishment of professional banks and new energy companies match, and the creditor-based margin financing and securities trading function is new. The energy industry has developed special bond financing instruments and increased support for venture capital development.

At present, the overall size of new energy companies is relatively small, overall strength is weak, and the overall financing capacity of the industry is limited. Clustering financing can not only improve the information sharing problem of enterprises, but also enable the security companies of new energy companies to meet bank requirements, thereby increasing the possibility of new energy companies obtaining indirect financing and effectively reducing the financing costs. The industrial cluster financing is based on the development of industrial clusters. It is necessary to formulate a matching development plan with local capital resources and industrial development level, provide key support for leading enterprises with obvious advantages, and then promote the rapid development of second-tier enterprises in the cluster. In addition, information sharing platforms are built within the cluster to improve information delivery and sharing services so that enterprises can seek common development in the production and financial markets.

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