Theoretical Research on the Construction of Credit System in Electricity Market

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ABSTRACT

The time for credit management in China is not long. In 2007, China clearly proposed to improve the credit construction of various industries, the power industry response policy requirements, and put forward credit evaluation standards and reward and punishment mechanisms. In 2016, with the promulgation of Circular No. 9 of the power system reform, the power market reform was intensified, and the credit risk of the power market was further aggravated. But so far, the credit risk management system of the power industry is still not perfect, and there are various problems in related literature research. In order to solve the problems existing in the credit evaluation system of the power industry today, and to better cope with the credit risk challenge brought by the power reform, this paper will combine the brainstorming method and the Delphi method to propose the multi-agent credit index evaluation system based on credit analysis of power sale enterprises, power generation enterprises and large users, then adopt the analytic hierarchy process to set weights for the three-level indicators of different subjects, and construct a new credit market evaluation index system. Finally, some suggestions are put forward for perfecting and popularizing the credit system of electric power market.1

INTRODUCTION

Although the credit management in our country has not been carried out for a long time, but all walks of life to establish credit evaluation system is essential for the establishment of market mechanisms and standardize the market order, and it is...
the precondition and guarantee to promote the sustained, coordinated and stable development of the economy. In recent years, China Power Union and other power industry management organizations have attached great importance to the construction of credit systems in the industry. In 2007, 2015 and 2016, respectively, through the establishment of relevant institutions and the release of relevant policies, the credit evaluation system has been further improved. However, with the advancement of the power system reform, uncertain factors such as two-way interaction between supply and demand in the power market, more diversified market entities, and the release of power-selling side have increased the variability and complexity of the power market environment, and the market trading rules are not perfect, which increased the occurrence of various types of credit risk.

But so far, the credit risk management system of the power industry is still not perfect, and there are various problems in related literature research. First of all, different literature studies divide the credit risk of the power industry into many different types because of different research objects or different credit risk identification methods in the power industry. For example, the literature [1] uses the brainstorming method to divide the credit risk of power companies into customer credit risk and external environment risk, the literature[2] combines the characteristics and processes of the power grid construction, adopts the Delphi method and the brainstorming method, and divides the credit risk of the grid enterprise into technical risk, market risk, project management risk and policy risk. Secondly, in the construction of the credit index system of the power industry, there are also many problems, such as a large number of indicators, many qualitative indicators, few quantitative indicators, and large differences in weight settings.

In order to solve the above problems in the power industry and to better cope with the credit risk challenge brought by power reform, we believe that it is necessary to analyze the various credit risks that may be generated by the main body of the power market and establish a new credit evaluation index system of the power market. The indicator system maintains the fairness and standardization of market operations, reduces losses caused by market risks, and improves market operation efficiency. Therefore, this article will combine the brainstorming method and the Delphi method to propose a multi-agent credit index evaluation system based on credit analysis of power sales enterprises, power generation enterprises and large users, and then adopt the analytic hierarchy process to set up the weight for the three level indexes of different subject, and finally put forward some suggestions for improving and promoting the construction of the power market credit system.

ESTABLISHMENT OF CREDIT RATING INDEX SYSTEM FOR ELECTRICITY MARKET

The basis of comprehensive credit evaluation in the power industry is to establish a sound credit rating system for the power industry. Because most of the enterprises in the power industry are large in scale and face strong credit risks,
multi-level and multi-agent analysis is needed. This paper analyzes the credit risk of each power market member - selling enterprise, power generation enterprise and large user from the perspectives of systemic risk, individual congenital risk and acquired risk, and uses AHP to set the weights of the third-level evaluation index. And finally complete the construction of a credit evaluation index system for the power industry.

For power sales companies, their risks are mainly classified into systemic risks, individual innate risks, and individual acquired risks. Among them, system risks include policy environment, market environment and economic environment risks. The three-level indicators and weights are respectively supporting policies for power system reform(33), related rules and regulations of group companies(33), transaction supervision (33), and information disclosure (33), energy price level (35), economic development trend (33); Individual innate risk includes basic conditions, staffing, business ability, three levels of indicators and weights are equity investment structure(6), corporate qualification(6), enterprise information(80), professional talents(40), personnel stability (10), the integrity of the power sales technical support system(19), operating electricity(80), distribution network management rights(19), Business area(40); Individual acquired risks include competitive transactions, obligation fulfillment, credit status, financial status, three-level indicators and weights are personalized value-added services(46), customer development and maintenance(22), guide users to participate in demand-side responses(31), quality of power supply service(56), confidentiality of user information(32), scheduling management(14), fault repair timeliness(9), timeliness of subsidies for renewable energy(9), market commitments(9), credit records(65), contract settlement(45), contract performance (45), solvency(39),profitability(39), earnings growth(39).

Among them, the level of energy prices is quantitative indicators, the higher the level of energy prices, the higher the risk, which is evaluated with price growth level, when energy prices growth rate is slower than the trend of economic development, the energy price level is good.

The economic development trend is a quantitative indicator, reflected in the GDP growth rate. The trend of economic development also affects the profitability of power sales companies, the better the economic development trend, the lower the corresponding risks.

The equity contribution structure refers to the proportion of shares of different nature in the total share capital of the company and their mutual relationship.

Enterprise qualification refers to the necessary qualifications for the enterprise, such as whether it has a business license that is compatible with the business scope.

Enterprise information refers to whether the enterprise is registered with the trading institution as required, and whether the registration information is true and perfect.

The perfection of the sales technology support system is a qualitative indicator. The higher the system perfection is, the better the marketing is and the better the business ability is.
The scope of business is evaluated by the scope of the electricity operated by the enterprise.

The distribution network management right is a qualitative indicator, and the power sales enterprise with distribution network management rights has advantages.

Distribution market share refers to the company's share of power distribution in the market, the higher the share, the better.

Personalized value-added services are the ratio of revenue generated by value-added services such as contract energy management, comprehensive energy conservation and demand side management provided by enterprises to total revenue.

The development and maintenance of customers is a quantitative indicator, which is reflected by the customer's retention rate.

The quality of the power supply service can be reflected by user satisfaction. The sales company is obliged to keep the user's electricity consumption, load curve and other information confidential, which is reflected by the number of user complaints.

Dispatching management means that an enterprise should obey the unified scheduling of the dispatching organization and reasonably organize its grid operation and grid equipment operation.

The timeliness of fault repair is a quantitative indicator, the proportion of fault time = fault time/total working time. The electricity sales company has the obligation to pay the renewable energy subsidy.

The timeliness of the subsidy for renewable energy refers to whether the electricity sales company has paid the renewable energy subsidy in time.

For power generation companies, their risks are mainly classified into systemic risks, individual innate risks, and individual acquired risks. Among them, the secondary and tertiary indicators of systemic risk are the same as those of power-selling enterprises; the secondary indicators of individual innate risk are the same as those of power-selling enterprises, the three-level indicators and weights are directly purchased by large users (94), qualifications of enterprises (46), disclosure of corporate information (46), proportion of senior talents (10), level of personnel stability (10), degree of informationization (5), energy consumption level (47), installation of environmental protection facilities (21), the proportion of high-efficiency or clean energy installed (21); The second-level indicators of individual acquired risk are divided into the same as the electricity-selling enterprises, the three-level indicators and weights are competitive electricity (52), power generation hours (69), customers development and maintenance (33), ancillary service provision (28), dispatch management (28), market commitment (19), credit history (65), contract settlement (46), contract performance (46), solvency (39), profitability (39), earnings growth (39).

Among them, large electricity customers supplied directly access refers to whether the power companies have qualified to participate in large consumers direct purchase of electricity.
The installation of environmental protection facilities is reflected by the number of installations of the corresponding environmental protection facilities.

The proportion of clean energy installed capacity is a quantitative indicator, the proportion of clean energy installed capacity = clean energy installed capacity / total installed capacity of power generation enterprises.

Competitive electricity refers to the amount of electricity generated by power generation companies through market transactions.

For large users, the risks are mainly classified into systemic risk, individual congenital risk, and individual acquired risk. Among them, the secondary and tertiary indicators of systemic risk are the same as those of power-selling enterprises; Individual innate risks include basic conditions and trustworthiness, and third-level indicators and weights are respectively enterprise qualification(66), large user access qualification(115), corporate information disclosure(28), power market talent(17), power stability (28), load forecasting accuracy(46); Individual acquired risk is divided into demand side management, credit level, financial status, three levels of indicators and weights are requirement side response participation(38), power management(38), demand side response(38), credit history(92), electricity bill settlement(60), power usage deviation(60), solvency(58), profitability(58), profit growth(58).

Among them, the accuracy of load forecasting refers to the accuracy of the user's prediction of the power consumption curve, which can be reflected by the annual deviation assessment.

The demand side response refers to whether the user side has a certain demand side response capability, which can be judged according to the user's power elasticity and flexibility resource level.

**SUMMARY AND RECOMMENDATIONS**

In order to better promote the construction of the rating index system of power companies and give full play to the role of rating indicators, this paper puts forward the following suggestions:

1. Accelerate the construction of a credit system for the power industry.

   The company's credit rating requires various types of data from the company, but due to the imperfect construction of China's credit information system, the credit data is single, and the data cannot be transmitted to each other very well. In order to form comprehensive information reflecting all aspects, it is necessary to speed up the construction of the credit system of the power industry. Through the CLP, local governments will establish local credit centers of the power industry, collect and integrate all kinds of integrity records of enterprises, and enter them into the database to build unified credit platform power industry, which provides a realistic basis for the level of integrity of power enterprises.

2. Standardize the authenticity of corporate information disclosure.
The truthfulness of the data given by the enterprise to the rating agency is directly related to the company's own rating results, but the company's accounting fraud is widespread, the departments that hold the data cannot provide real and effective data, which will adversely affect the credit rating results. So it is necessary to establish a sound legal supervision mechanism and improve social morality construction. Under the influence of both law and ethics, enterprises can enable to submit real data to credit rating agencies and regulate the disclosure of corporate information.

(3) Accelerate the construction of relevant legal systems.
The legal system is an indispensable part of the credit system. Strengthening the credit law environment enables credit and rating agencies to collect credit information quickly and completely, and it is helpful to promote the development of credit system and also to promote the development of rating agencies themselves.

(4) Improve the cultivation of talents in the rating industry.
The credit rating industry not only needs rating personnel to have a high professional theoretical foundation and practical ability, but also needs them to know how to communicate effectively with customers. However, there are few colleges and universities with rating specialty in China and the level of talent training is low. Therefore, we should try to promote the development of talent training in rating industry, improve the professional quality of rating personnel, and promote the development of our country's industry rating system.

(5) Strengthen the normative nature of the industry.
Due to the large number of rating agencies in China and the limited demand for credit rating market, some rating agencies may overestimate the credit rating of the evaluated enterprises. In order to avoid confusion in the rating industry, the state should speed up the construction of credit rating management centers and strengthen the theoretical literacy and industry ethics awareness of rating personnel. At the same time, the rating management center can establish various rules and regulations to constrain the bad behavior of rating agencies and promote the sound development of China's rating industry.

(6) Promote the unity of credit rating indicators.
Because the current credit rating agencies use different rating indicators when conducting credit rating, the comparability and the information caliber of these rating indicators is poor. Therefore, it is necessary to establish a credit evaluation index system for electric power industry to guide the rating agencies to complete the credit rating of power enterprises. At the same time, through the establishment of industry credit management centers to promote the basic rating indicators, strengthen the comparability of the credit ratings of various companies in the power industry.
REFERENCES