

# Research on development path of China's energy finance in the era of big data

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**Abstract:** *The arrival of the era of big data highlights the importance of information competition and network advantages, promotes the theoretical innovation of energy finance, and provides a new analysis tool for energy finance market. China's energy finance faces new challenges in market design, transaction mode and risk monitoring. On the basis of analyzing the development problems of energy finance in China, this paper discusses the new development path of energy finance in China, so as to play an important role in the global energy finance system.*

**Keywords:** *Big data; Energy finance; Financial networks; Financial markets; Development path*

The arrival of the era of big data highlights the importance of information competition and network advantages. The traditional market trading model has been subverted, and high-frequency monitoring and trading, market public opinion analysis and ubiquitous network contagion have become the new keywords leading market trading. Big data mining and analysis technologies can trace the market behavior of each market participant, thus greatly improving market transparency and supporting faster and more flexible market trading activities; More importantly, it will force market participants' decision-making mechanisms to shift to more micro and quantitative data finance. The era of big data finance will certainly bring new opportunities for the development of energy finance in the world, and also bring new research fields for the development of energy economics [1].

## 1 Big data and energy finance

Big data technology promotes theoretical innovation of energy finance. Combining the traditional market theory with network analysis method, expanding the existing methodology and research scope from the new perspective of information theory and behavioral finance, new research directions and scientific problems is forming. Its core is how to establish a systematic analysis method and theoretical system of massive energy market data, and establish an energy financial data network by taking high-dimensional investor information, transaction information and various events as attributes. Capture market dynamic public opinion comprehensively by tracking trader behavior and event effect; analyze the mechanism of market price from the perspective of investor behavior and market expectation, predict market risks, and support investor decision-making in the era of big data.

Big data technology provides a new means of analysis for energy financial market. The market is composed of numerous micro-behaviors. Accurate mining, agile monitoring and high-dimensional analysis of market micro-behaviors from massive data will greatly improve the accuracy and effectiveness of market analysis. At the same time, big data technology makes the dynamic transmission between traders' behavior, market news and market macro performance more rapid, and the macro and micro gap is narrowing or even disappearing. The research scope of energy finance and behavioral finance needs to be greatly expanded, and the analysis of energy market is more complex and fast.

## 2. Problems existing in the development of China's energy finance in the era of big data

### 2.1 The financing capacity of the energy industry is weak, and the development of energy finance is slow

As we all know, the energy industry is capital and technology intensive, and the exploration, exploitation and development of energy need a lot of funds, so the primary problem facing energy enterprises is financing. Unfortunately, the financing capacity of China's energy industry is relatively weak, which affects the development of energy finance [2].

The financing utilization of foreign capital in China's energy industry is low. Generally speaking, China has become the world's largest energy consumer and the energy industry has a high income, which should be very attractive to foreign investment. However, in China, the investment in the energy industry is increasing year by year. However, investment in the energy industry mainly comes from domestic bank credit and government financial investment, almost no foreign investment. This is caused by the low degree of opening up in China's energy field.

The financing method of China's energy industry is relatively single. Due to the low degree of marketization of China's energy industry, the capital source of China's energy enterprises mainly depends on bank credit, and the proportion of bond financing is not high, and the energy enterprises that distribute shares to finance is very rare.

## **2.2 Contradiction exists between energy industry system and financial system**

According to the current development, the dynamic coordination mechanism between energy industry and financial industry is very imperfect. First of all, the development status of China's financial industry is that the Midwest is far behind the east, while energy is concentrated in the Midwest, which has a certain impact on the financing of energy enterprises in the Midwest. Secondly, the pursuit of bank credit is high yield and low risk, which leads to bank credit mainly favoring those energy fields with low development level, namely credit resource mismatch. With market monopoly, these fields can get high profits, but they also have the defects of high pollution and high waste. Finally, the financial industry pays most attention to risk control, while the energy industry not only has long production cycle, but also has frequent price fluctuations.

## **2.3 Control of energy financial risks**

China's energy finance system is not perfect, and energy finance risk control problem has become one of the obstacles to the development of energy finance [4]. First, domestically, the financial sector is optimistic about the energy industry, and major financial institutions have invested in the energy sector. However, financial institutions invest in a very high concentration of industries and companies, and the safety of these investments remains in question. In addition, with the intensification of competition among energy enterprises, the development of energy finance in China has exposed many contradictions and problems, and the uncertain factors in the development of energy finance have increased, and the security of energy finance is very worrying. Secondly, Internationally, the situation of the international energy market has become very complicated due to the huge fluctuation of the US dollar in recent years and the manipulation of international financial giants. The international energy price often has abnormal changes, which undoubtedly increases the difficulty to control the energy financial risks in China. Third, China is a big oil consumer, but also a big oil importer, and China's oil dependence is very high.

## **3. New development path of energy finance in China**

### **3.1 Develop energy virtual financial system and establish specialized energy financial institutions**

With the development of economy, China has become the largest energy consumer and the second largest oil consumer in the world. However, there is still no professional energy futures exchange in China, and there is no professional energy bank, which undoubtedly weakens China's voice in the international energy price. Although financial capital cannot completely determine the international energy prices, but the impact on energy prices is undoubtedly very large [3]. To put it simply, there is no professional financial institution such as energy futures exchange to promote the development of energy industry in China. Therefore, we can see how important it is to establish professional energy financial institutions in the central and western regions, which can not only gradually improve China's pricing power over international energy prices, but also promote the development of energy finance industry in the central and western regions.

### **3.2 Establish the investment and financing system of the energy industry and promote the diversification of energy investment and financing**

At present, China does not have a real sense of energy industry investment and financing system, which leads to the disordered situation of energy investment and financing in China, and seriously affects the healthy development of energy finance in China. Therefore, China should speed up the construction of the investment and financing system of the energy industry, and promote the transformation of China's energy investment from unrationalization to rationalization. Specifically, the system should have the following three functions. First, the system should be able to promote the diversification of energy investment and overcome the previous defects of concentrated energy investment. Secondly, the system should promote the diversification of investment subjects, change the situation of single bank loan, and form a new financing platform that can attract the participation of all walks of life, thus expanding the financing capacity of energy enterprises invisibly. Finally, the system should also promote the diversification of investment methods, combine the construction of the investment and financing system of the energy industry with the innovation of financial products, constantly enrich the investment means of the energy industry, and further disperse the financial investment risks of the energy industry investors.

### **3.3 Establish a monitoring and early warning mechanism for energy financial risks to control energy financial risks**

Bank credit risk monitoring and early warning mechanism. It is undeniable that most banks in China are still troubled by non-performing loans, so how to reduce the non-performing loan ratio is the most important task for banks. However, we must make it clear that prevention is the key to solving the problem of non-performing loans. First, banks should effectively check the approval of energy enterprise loans, and give internal credit rating to important customers, and strengthen the effect of risk management. Second, the operating conditions of loan enterprises should be regularly monitored and evaluated. Once the financial conditions of energy enterprises change significantly, targeted disposal plans should be put forward immediately to reduce bank losses.

Energy industry prospect monitoring and early warning mechanism. On the one hand, the financial regulatory authorities have not included the prosperity analysis of the energy industry into the framework of energy financial risk analysis. Even if there is related preliminary analysis, it is only for a very few local energy enterprises. On the other hand, it is also difficult for financial institutions to obtain the investment and financing data and real operating data of large energy enterprises. These two situations directly cause the financial regulatory agencies cannot timely make accurate risk warning of the new situation and new changes in the development of the energy industry.

Energy virtual financial risk monitoring and early warning mechanism. Virtual financial risk monitoring and early warning mainly lies in two aspects: warning source analysis and warning sign identification. First of all, we should do a good job in the analysis of alarm sources, monitor and control the key factors affecting the development of the energy industry, and take relevant preventive measures. Secondly, through qualitative and quantitative analysis, we can capture the clues of energy market changes, accurately judge whether there will be energy virtual financial risks, and take relevant countermeasures.

### **3.4 Actively develop new energy and further improve the energy financial system**

It can be foreseen that new energy will be the hope of the future energy industry and one of the core elements of the future economic competition of various countries. Therefore, if the development of energy finance in China wants to take the initiative in the international energy competition in the future, the support of the financial industry should not only be aimed at conventional energy, but also should increase the support to the new energy industry. Generally speaking, the new energy industry is characterized by difficult development and utilization, long development cycle and high investment risk, so financial capital is generally reluctant to invest in the new energy field on a large scale. Therefore, on the one hand, the bank's credit policy should be inclined to the new

energy industry to a certain extent, and actively develop the financial derivatives of new energy to provide strong financial support for the development and utilization of new energy. On the other hand, the government should vigorously support the development of the new energy industry. It should be emphasized that the government's support for the new energy industry should not only be limited to the government's financial support, but also include market access, technical support, development space, and the introduction and granting of international resources.

#### 4 Conclusion

The construction of China's modern energy market system needs to adapt to the requirements of the era of big data. Massive data and qualitative progress of data processing technology bring new ideas and challenges to the market design, transaction mode and risk supervision of energy finance in China [5]. Only by making full use of and mining the ubiquitous information network, can we build an international market platform to meet the needs of so frequent trading, such as oil futures trading platform and data platform. Establish energy financial risk supervision and assessment mechanism, highly alert to new hidden dangers brought by information security, and establish a complete market monitoring, forecasting and early warning system; Only by innovating financial products and developing new analysis and trading tools based on the perspective of big data can we promote the formation and development of China's energy financial market in a healthy and rapid way, so as to occupy a place in the global energy financial system.

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