



Energy Finance in the Age of Big Data

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Since the beginning of the 21st century, energy has become a new financial investment vehicle, indicating the arrival of a new era of energy finance.

In the process of energy financialization, the electronic information carrier and network platform plays an important role. The arrival of the age of big data highlights the important position of information competition and network advantage. The traditional market transaction pattern has been overturned, and the high-frequency monitoring & transaction, market public opinion analysis and ubiquitous network contagion become the new keywords leading the market activities. For example, the world's oil market system is gradually evolving into a full-range and high-depth integrated big data network with the crazy development of the ubiquitous information network; the big data mining and analysis technique can even trace back to the market behavior of each market participant, greatly improving the market transparency and supporting the more rapid and flexible market transaction activity; and more importantly, the decision-making mechanism of market participants is forced to change towards the more microcosmic and quantitative data finance. The age of big data finance will certainly bring new opportunities to the development of the world's energy finance and also bring the emerging research fields for the development of energy economics.

Big data technology promotes the theoretical innovation of energy finance. Combining the traditional market theory with the network analysis method, it expands the existing methodology and research scope from the new perspectives of information theory and behavioral finance and is forming new research directions and scientific issues. Its core issues include how to establish the systematic analysis method and theoretical system for the massive data of energy market, and then use the high-dimensionality investor information, transaction information, various events, etc. as the attributes to establish the energy finance data network; how to capture the dynamic public opinions from the market in an all-around manner

through tracing the trader behavior and event effect; how to analyze the market pricing mechanism from the perspective of investor behavior and market expectation; and how to predict the market risk and support the investor's decision-making in the age of big data.

Big data technology provides new analysis tools for the energy finance market. The market is composed of innumerable microscopic behaviors, and the accurate mining, agile monitoring and high-dimensionality analysis of the market microscopic behaviors from the massive data will significantly improve the accuracy and effectiveness of market analysis. Meanwhile, the dynamic conduction between the traders' behaviors & market information and the market macro performance will be quicker, the macro-micro gap is becoming smaller and even disappeared, the research category of energy finance and behavioral finance needs to be largely expanded, and the analysis of energy market needs to be more complex and faster.

Establishing the modern energy market system in China must cater for the demands of the age of big data. The massive data and qualitative progress of data processing technology propose the new ideas and challenges for the market design, transaction mode and risk monitoring of China energy finance. Only by making full use of and mining the ubiquitous information network, and establishing the international market platform meeting the high-frequency transaction demands, such as the petroleum futures transaction platform and data platform; and establishing the energy finance risk monitoring and assessment mechanism to highly alert the new hidden dangers caused by the information safety, and establishing a set of complete market monitoring, predicting and warning system, can we innovate the financial products and develop new analysis and transaction tools based on the perspective of big data and healthily and quickly promote the formation and development of China energy finance market, so as to have a place in the global energy finance system.