

Analysis of the Legal Regulation of Financial Derivatives Trading Based on The Development of Fintech

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Abstract: The rapid development of fintech has brought about profound changes to financial markets. As financial derivatives, which have become an important pillar of modern financial systems, are constantly innovated with the support of new technologies. Inherent financial risks and high quality productive forces of innovation have brought complex situations. Frenzied innovation constantly evades the supervision during the process of technological development, which not only increases the transactional risks dramatically but also may cause the failure of financial system. This paper discusses the legal issues in fintech derivatives trading by reviewing the related researches from all over the world, and puts forward corresponding regulatory measures.

Keywords: Fintech; Financial derivatives; Legal regulation.

1. Introduction

The essence of financial derivatives is a contract, and the value of financial derivatives comes from the price of underlying assets (stocks, bonds, futures). Due to its high leverage and high risk characteristics, they are also important investment and arbitrage instruments in the market.

On September 8, 2025, the China Futures Association published in the Shanghai Securities News that "the trading volume of the national futures market in August 2025 increased by 21.38% year-on-year", briefly describing the trading situation of the national futures market in August 2025. According to unilateral calculation, the trading volume of the national futures market in August was 839 million lots, with a trading value of 65.08 trillion yuan, increasing by 13.98% and 21.38% respectively year-on-year. From January to August, the cumulative trading volume of the national futures market was 5.974 billion lots, with a cumulative trading value of 476.12 trillion yuan, increasing by 21.74% and 22.85% respectively year-on-year.

With the development of financial derivatives, the legal issues also increase. In recent years, the situation of disputes in financial industry has changed. According to the data, China International Economic and Trade Arbitration Commission has accepted 6013 new cases this year, an increase of 14.82% year by year, which has reached 6000 cases for the first time. At the same time, the total amount of disputes reached 188.96 billion yuan, an increase of 25.12% year by year, and it has exceeded 100 billion yuan for 7 consecutive years, showing a dual increase in the number of arbitration cases and the amount of disputes.

With the gradual promotion of fintech and financial derivatives trading, improving the legal system can not only promote the development of strong and sustainable economy, but also ensure the stability of financial market.

2. Research Background and Objectives

2.1. Research Status

In May 2025, the China Securities Regulatory Commission

(CSRC) issued the notice of "Several policy measures to accelerate the establishment of a science and technology finance system for strongly supporting high level self-reliance and strength in science and technology". The notice clearly states that the construction of the system of science and technology finance needs a solid legal system as guarantee. Only in this way, can we promote the development of finance field in the field of science and technology to advance in an orderly way under the regulation of law, and then provide solid financial guarantee for realizing high level self-reliance and strength in science and technology.

With the deep integration of fintech and financial derivatives, Shanghai Dongzheng Futures has been dedicated to the research on fintech since putting forward a new strategy direction in 2020: "Stick to the direction of developing derivatives, insisting on taking fintech as the means to develop derivatives, and building two competitive advantages of research and technology, namely research cloud, intelligent trading, blockchain technology".

According to the Securities Law of the People's Republic of China, which is the basic law regulating financial derivatives, the types of derivatives are not listed, but specific provisions are made on the types of derivatives with obvious securities attributes by incorporating them into the definition of derivatives, so as to provide legal basis for the products.

The newly promulgated Futures and Derivatives Law of the People's Republic of China that takes effect from 2022 is the basic regulation for the futures and derivatives market. While maintaining the stability of the market, it also makes corresponding provisions for investor protection. Although there are some provisions in current regulations, there are still certain gaps in terms of comprehensive supervision, supervision of OTC derivatives, protection of traders and risk control. The emergence of fintech as a new disruptive factor has brought uncertainties to the financial market, intensified the problem of high-frequency trading and raised concerns about data security. These new situations have brought challenges to the existing legal system and regulatory system. Filling the blanks in regulations and reducing risks have become urgent and important tasks for the financial industry.

2.2. Research Objective

This paper, based on the problem of "disconnection between macro principles and micro rules", takes the legal characterization of smart contract and liability determination of algorithmic loss as the research objects, and conducts in-depth research on specific micro legal rules, so as to fill the loopholes in the application of existing "Futures and Derivatives Law" in the financial technology scene and make up for the rules.

According to the call made by China Securities Regulatory Commission at the "15th Five-Year Symposium" to "perfect the construction of derivatives legal system", we can also draw on the tools of regulatory sandboxes and regulatory technology to explore how to establish an adaptive regulatory legal system of rules and regulation technology, facing the new situation of innovation and risk, to solve the problem of regulatory lag and arbitrage.

Based on the case study in the article, the innovative practice of advance compensation is advanced, and a new legal system of investor protection and relief based on blockchain and smart contract is designed and implemented, such as the advance compensation mechanism of smart contract, to solve the problem of information asymmetry and power.

Considering the problems of cross-border evidence collection, legal application and legal cooperation and regulatory cooperation, the study aims to protect the right and interests of investors and the stability of the securities market by choosing law, cooperation in the judiciary and international regulatory cooperation according to the situation of legal conflict.

3. Research Methodology

3.1. Research Theory

3.1.1. Legal Value and Regulatory Model

Yuan Kang's "Technical Risks and Legal Governance of Financial Technology" comprehensively explores the inherent risks in the development and application of financial technology based on an analysis of industry trends and market practices. This literature delves into two main risk management tools, namely regulatory sandboxes and regulatory technologies [1]. The book discusses the overall principles and conceptual framework, but does not address specific regulatory issues in the rapidly developing derivatives field, particularly legal conflicts in micro smart contracts. Therefore, this study explores key issues based on the analysis of derivatives regulation.

On August 29, 2025, "15th Five-Year Symposium" took place in Beijing. Target opinions and suggestions were put forward on how to do a good job in capital market "15th Five-Year" plan. The symposium proposed that we should further improve the legal system in key areas of capital market, including stocks, bonds, derivatives and cross-border supervision to perfect three-dimensional accountability system and severely crack down on illegal and disciplinary behaviors, including financial fraud, market manipulation and insider trading. The significance of this symposium is to determine the legislative and regulatory orientation of "strong supervision and risk prevention" for financial derivatives market in China in the future at the national level, which provides great forward-looking guidance for this research. However, the symposium only put forward the issue of how to do a good job in future in the field of strong supervision

and risk prevention without put forward specific opinions. This paper aims to transform the macro objective into concrete measures.

The penetration of fintech into the derivatives market is no longer merely a simple innovation of tools, but a profound challenge to the legal regulatory system. As Amer, Barberis & Buckley pointed out, the essence of this transformation is a fundamental shift in the regulatory paradigm from 'Know Your Customer' (KYC) to 'Know Your Data' (KYD) [2]. This reveals that the core legal values pursued by regulation—such as safety, stability, fairness, and efficiency—are essentially being reshaped by technological forces. Safety is no longer solely dependent on capital adequacy but increasingly relies on real-time, transparent data supervision; stability requires algorithmic monitoring of systemic risk; fairness faces new challenges from code barriers and algorithmic discrimination; and efficiency seeks a balance between automated execution and potential technological risks. This article aims to explore in depth the complex conflicts in the legal regulation of financial derivatives in the context of fintech and the new paths for adjustment in terms of value dimensions.

3.1.2. Determination of Legal Relations and Legal Liability

According to a February 6, 2025 report by China News Service, the Beijing Financial Court has applied Hong Kong law to rule on the first case of mainland investors buying overseas financial derivatives. The court's ruling provides new guidelines for how judicial authorities handle cross-border transactions. As China continues to deepen its reforms in the economy, the scope of China's trade and economic activities has gradually expanded, and the number of civil and commercial cases involving Hong Kong, Macao, Taiwan and foreign countries has continued to increase. Experts in law said that courts should skillfully apply international law in fair judgments. When the laws of foreign jurisdictions 'laws are required in cross-border civil cases, courts should thoroughly investigate relevant legal situations and use them properly. This case shows the regulatory contradiction between China's financial technology development situation and current laws and regulations. It is necessary to explore new solutions to the problems brought by new productive forces in the fintech era.

The book 'Swiss Derivative Markets' states that the Swiss Financial Market Supervisory Authority (FINMA) is responsible for regulating financial derivatives trading and ensuring market compliance. At the same time, it is mainly based on the Financial Market Infrastructure Act (FinMIA), which clarifies the disclosure requirements, risk management, and central clearing obligations for derivative trading. However, there is a contradiction between the traditional confidentiality of Swiss banks and the transparency requirements of derivative trading, which requires a balance between customer privacy and regulatory needs. For new derivatives on DLT platforms (such as cryptocurrency derivatives), there are still legal gaps, and further clarification of jurisdiction and responsibility allocation is needed [3]. Our article studies the need for legal regulation of derivatives to balance market efficiency and risk prevention, and to enhance regulatory effectiveness through international cooperation (such as compliance with international clearing standards).

3.1.3. Consumer Rights and Judicial Practice

Cao Peng and Luo Xingping in their article "Legal Protection Dilemmas and Improvement Strategies for Personal Financial Information in the Digital Economy" wants to strengthen financial regulators on the protection of

personal financial information, build systematic information protection laws and improve more mandatory regulations to avoid that financial institutions and other controllers have power but lack of supervision [4].

Although the two authors suggest to strengthen regulations, they didn't give a proper explanation to the application of new technologies (blockchain and artificial intelligence technology) in personal financial information protection. As we all know, new technologies always have dual characteristics. If we make a critical analysis on its application and make advantages to cover its defects, we will get more benefits. Therefore, the study believes that we should formulate corresponding regulations and technical standards according to the new situation of technology development (such as applying blockchain technology in data security and privacy protection, applying AI technology in risk monitoring and early warning).

On September 24, 2013, China Securities Regulatory Commission issued "Administrative Penalty Decision on Fraudulent Issuance of Stocks by Wanfu Biotech". On May 10 of the same year, in order to compensate for the investment losses caused by the false issuance by Wanfu Biotech, Ping An Securities Co., Ltd. (listed sponsor and lead underwriter) agreed to contribute 300 million RMB into the establishment of "Special Compensation Fund" to compensate for the losses of investors. It was the first case in the history of China's securities market in which the intermediary institution made pre-compensation by its own effort. Article 93 of Securities Law stipulates: If the issuer causes losses to the investors because the issuer has committed fraudulently issued stocks, made false statements or other major illegal acts, the issuer's controlling shareholder, actual controller or some relevant securities companies may entrust investor protection agency to reach a compensation agreement with the damaged investors and provide advance payment. After the issuer's pre-compensation, the issuer and other joint liability parties may request the issuer and other joint liability parties to recover. This study suggests that under the situation of fintech, referring to the experience of pre-compensation, it is recommended that we should introduce an "intelligent contract pre-compensation mechanism". Once the conditions for compensation are met, the intelligent contract will automatically execute the process of compensation. The intelligent contract makes sure that investors can get compensated in time. This mechanism not only improves the compensation efficiency and reduces the judicial cost, but also improves the transparency of the market and the trust of investors, protecting the right of investors.

3.1.4. Foreign Cases

India's securities derivatives market regulator, Securities and Exchange Board of India (SEBI), has accused Jane Street Capital, a leading Wall Street market maker and high-frequency trading firm, of manipulating the securities derivatives market with "malice" and put a trading ban on Jane Street Capital in India.

According to SEBI, its investigation revealed that Jane Street manipulated the spot and futures prices by heavy trading in Indian securities derivatives market around the time when bank share index options were due to expire, and misled and attracted large number of retail investors. The case revealed the severe challenges faced by cross-border evidence collection and the insufficient development of regulatory technology, and also highlighted the importance of protecting small and medium investors' rights and interests and

maintaining market fairness in markets where institutions and retail investors were unbalanced in power. In addition, the case raises urgent questions on how to balance financial innovation and market fairness through laws, and how to protect retail investors' rights.

3.2. Method Improvement

Existing literature focused on macro risks and principles. This study focuses on financial derivatives, a specific field with high risk and high technology content, and combines its continuous integration with fintech, so that the research content is more delicate and refined.

On the basis of previous experiences of advance compensation, we innovatively proposed "Smart Contract Advance Compensation Mechanism". By embedding compensation clause into smart contract through blockchain technology, the system automatically executed payout procedures when the conditions were met and investors could get compensated quickly. Tamper-proof of blockchain ensured that the whole process of compensation was fair and transparent and prevented malicious default and other fraudulent behaviors. This innovative method would provide a new legal protection and risk control means for financial derivatives market in the fintech era, with great practical significance and wide application.

Because of the frequent occurrence of cross-border crimes, cross-border evidence collection is increasingly difficult. In order to prevent small investors from being involved in the problem of delayed information and being led astray by speculation deliberately, and to maintain the stable operation of international financial market, it is proposed that a cross-border regulatory cooperation mechanism be established in an innovative way. The existing EU has relevant legal practices, and the specific measures are as follows.

Unified data protection: The EU has established a unified data protection system to protect the secure transmission and legal use of transaction data between different EU member states and to avoid the legal risk of different data protection levels between different countries.

Innovation Guidance Window Establishment: All EU member states have established innovation guidance windows to provide legal consultation and regulatory guidance service for fintech companies. These windows not only help businesses comply with the relevant laws and regulations during the innovation process and significantly reduce the illegal transaction ratio, but also promote the healthy development of financial market by providing legal advice and suggestions.

Construction of the regulatory sandbox: The EU promotes the implementation of the regulatory sandbox by legislation, providing a legal protection testing zone for the fintech enterprises. The regulatory sandbox enables the enterprise to test new fintech products and services within the certain range without any fear of being penalized for breaking the laws. By referring to the international reference "regulatory sandbox" to China's situations, it realizes the localization and implementation. According to the strong regulation implementation orientation of the "15th Five-Year Plan" of China Securities Regulatory Commission, new attempts for the technology legal supervision with Chinese conditions are put forward.

Cross-border regulatory cooperation: The EU promotes the coordination and cooperation between the regulatory authorities of the member states by establishing cross-border

regulatory cooperation system, which includes cross-border data sharing agreement, joint regulatory actions and cross-border law enforcement cooperation.

The above-mentioned legal system and cross-border cooperation on regulatory cooperation not only provide a more fair and transparent legal environment for the fintech enterprise in the member state, prevent some cross-border financial crimes, but also enhance the exchange and cooperation between the countries and promote the healthy development of fintech.

4. Propose

Deep Research on Fintech and Financial Derivative Law: Holding regular seminars to solve the legal issues in the face of new technology, such as algorithmic trading and smart contract. Promote careful research by focusing on certain micro level questions, and obtain a systematic answer that provides theoretical support for the innovation of supervision.

Improving Relevant Laws: The legislature should timely improve and perfect the Futures and Derivatives Law and other laws and regulations according to the development of Fintech, so that the law can better serve the financial derivatives trading in the Fintech scene, so as not to let the speculator occupy the "legal loophole".

In order to promote the regulatory innovation and improve the investor protection mechanism: regulators should use the regulatory sandbox and regulatory technology (regtech) to explore the adaptive regulatory system for the development of fintech. Enhanced collaboration with overseas counterparts would help mitigate cross-border regulatory challenges and enhance regulatory effectiveness and coordination. Furthermore, it is recommended that regulators implement a "smart contract pre-compensation mechanism". By applying blockchain technology, smart contracts can automatically compensate investors and investors can get compensated quickly.

International cooperation and exchanges: Actively participate in the formulation of international financial regulatory rules, share experience with regulatory agencies in other countries and regions, and respond to the common

challenges brought by the development of fintech. This will not only promote the exchange and cooperation between the countries, but also prevent some cross-border crimes of speculation effectively.

Promoting cross-discipline communication and cooperation: As finance is increasingly closely connected with technology, the professionals in the fields of finance, law and technology should strengthen communication and cooperation, discuss the legal regulation of financial derivatives trading in the background of fintech, form cross-disciplinary solutions, and promote the healthy and stable development of financial market.

5. Conclusion

This paper discusses the legal regulation of financial derivatives trading in the fintech era, describes the legal deficiencies of the current situation and puts forward the corresponding suggestions. As a strengthening of the law is an inevitable response to the challenges brought about by new productive forces, not only can it promote sustained economic development, but it can also maintain the basic stability of the financial market. With the development of fintech, updating financial derivatives-related laws in a timely manner is very important.

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