

Analysis of Selected Risks in the Futures and Options Markets and Their Management Strategies

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Abstract: The 2008 global financial crisis had profound impacts on the world's financial system. Countries around the world intensified their regulation of financial markets, especially the derivatives market. This paper explores some financial risks, non-financial risks and risk management strategies in the futures and options markets through literature analysis, aiming to help market participants manage and reduce potential losses. These risks include liquidity, credit, market, operational, model, and Herstatt risks. This paper finds that although there are many risks in the futures and options markets, investors can still pursue profits and manage these risks effectively at the same time by applying some appropriate risk management strategies, such as hedging, using appropriate models, and utilizing real-time settlement systems. These strategies are significant for improving market stability and investor protection. Additionally, this paper emphasizes the importance of providing education for market participants and global regulatory cooperation to further maintain market integrity.

Keywords: option market, future market, risk management, financial risk, non-financial risk

1. Introduction

It is known that the futures and options markets are significant components of the global financial system which can offer different tools to management and price discovery. The presence of futures and options markets not only enables people to have abilities to hedge risks that arise from market uncertainties but also enables people to leverage opportunities arising from market movements. However, there are inherent risks in these markets which can lead to serious outcomes, such as financial tightness. Therefore, it is important to develop an appropriate strategy to identify risks and manage them so that market stability can be ensured. This paper aims to discuss several risks which can be divided into financial risks and nonfinancial-risks firstly, then proposes regulation to counteract these risks. This paper can give effective solutions for financial companies against these risks.

2. Financial Risks

Financial risks are primarily from several financial factors, such as market volatilities and creditworthiness of counter-parties, which could lead to potential losses. It mainly involves liquidity risk, credit risk, equity prices, and market risk.

2.1. Liquidity Risk

Liquidity risk is one of the most common risks that companies face in their operation. It arises when a company cannot sell an asset without a significant price concession. In a highly liquid market, it is easy to buy or sell without a big price concession, but during some periods of illiquidity, it is more difficult to find counterparties and execute trades. It is vital to figure out the reason of this risk so that the management can be conducted. It arises from the inability to unwind a position rapidly without causing a significant market price impact [1]. The effects of this risk are serious as it may lead to difficulty in meeting financial obligations, increased funding costs and financial tightness. For example, if investors need to liquidate a position quickly when they faced with limited buyers, they must sell at a lower price which may result in financial losses. In general, there is a need to identify and manage liquidity risk since it is crucial for investors in futures and options markets. Monitoring this risk allows investors to conduct relevant strategies to mitigate its negative effects.

2.2. Credit Risk

Credit risk in futures and options is the risk that a counterparty to a contract fails to fulfill the obligations [2], such as failing to deliver the underlying asset. This default of a counterparty means people may not receive a promised payment so the non-defaulting party may suffer losses. The probability of credit risk is different in different markets. Exchange traded derivatives are guaranteed and significantly less prone to credit risk than over-the-counter (OTC) markets. The financial stability and trustworthiness of investors are significant indicators of the level of credit risk. When engaging in transactions, investors expose themselves to credit risk due to they do not know if another party will fulfill the transactions. Thus, people often take the initiative to assess the credit and financial status of their counterparties because they have an inherent inclination to hedge credit risk. The consequences of credit risk are severe. Firstly, the most direct consequence is financial loss. If a counterparty does not finish a transaction and meet the obligation, the non-defaulting party may suffer losses related to the value of underlying asset, potentially causing liquidity risk. Secondly, once one counterparty failed to fulfill the transaction, the non-defaulting counterparty may be prevented from executing their intended trading strategies and missing opportunities. Finally, the reputation of defaulting counterparties will be suffered if they default in transactions. Therefore, it is more difficult for them to attract future business opportunities. Moreover, the non-defaulting counterparties may be more cautious and reluctant to engage in other transactions.

2.3. Equity Prices

The risk of stock price changes directly affects the value of futures contracts and options whose underlying assets are shares of stock. These changes in equity prices can lead to substantial losses for option sellers who are faced with unlimited losses [3]. Because option sellers must be liable for the obligations to buy or sell the underlying at the strike price if the buyers choose to exercise the option. This risk is affected by a number of factors, including the financial health of a business, the circle of the economy, and personal reasons. Variations in these factors can cause stock price movements. For example, a company that announces its earnings reports that are disappointing may suffer from a decrease in the stock price that can lead to losses for investors holding futures or options based on

that company's stock. Therefore, it is necessary for investors who prefer stock-based options and futures contracts to manage stock risk in order to reduce losses.

2.4. Market Risk

Market risk refers to the combination of different risks, including interest rate risk, commodity price risk and foreign exchange rate risk [4]. Option and futures prices can be significantly affected by these risks. The first is that interest risk is an indicator of fixed income securities, the interest rate is inversely related to the value of fixed income securities. In general, when interest rates rise, the value falls, vice versa. Secondly, foreign exchange risk is related to foreign currencies. There is no fixed exchange rate, which means that there are fluctuations that may affect the price of these contracts. This risk should be noted and managed by investors with exposure to international markets to mitigate adverse effects. Third, commodity price risk refers to changes in commodity prices and these changes can lead to fluctuations in the value of options and futures contracts based on commodities. For example, if there is an increase in the value of an underlying asset of a future or option contract, the value of the contract increases as well. In order to avoid commodity price risk as much as possible, investors must monitor this risk closely and analyze the future price trend of this commodity. Awareness of various market risks is necessary for decision-making and prevention of adverse events.

3. Non-financial Risks

Non-financial risks are different from financial risks which are directly related to financial factors but still may lead to great losses. These risks can impact the stability and reliability of the operations and processes used in the market. Non-financial risks can be further mainly classified into operational risk, model risk and Herstatt risk.

3.1. Operational Risk

Operational risk arises from the failure of internal process, people, and systems or from external events [5]. These failures may involve human errors, IT system breakdowns, or even fraudulent activities, severely impacting the normal functioning of trading activities. In the options and futures markets, operational risk can take several forms including process risk, systemic risk, human risk, legal and compliance risk and external events. Firstly, the presence of process risk is the result of failures in the procedures, systems, and controls that a business has put in place. For example, if a trading firm has faulty procedures for monitoring its positions in futures and options markets, it might unknowingly exceed its risk limits, leading to greater losses. Secondly, systemic risk revolves around possible failures in trading platforms, potentially hindering trade execution or causing incorrect transactions. Human risk is the result of unintentional mistakes or intentional misconduct like fraud which can create trade discrepancies. Moreover, legal and compliance risk refers to legal penalties, financial forfeiture, and so on which are the results of failure to obey laws, regulations, standards, or ethical norms. Finally, external events include natural disasters, changes in policy, or other events which beyond a company's control.

3.2. Model Risk

Model risk refers to the risk associated with using inappropriate or incorrect models when making decisions. It arises when the models are used to price manage risks associated with futures and options fail to accurately capture the complexities of the real world, resulting in significant losses [6]. As investors, risk managers often rely on mathematical and financial models to price derivatives, conduct investment strategies, and control risk, it is important to make sure that the models are correct and

are used in an appropriate way. However, the application of erroneous models is inevitable due to lack of professional knowledge, if models provide inaccurate output, interest rates, price movements, volatility, and other factors cannot be predicted accurately. For instance, if people use an inaccurate model which underestimates potential risk or overestimates potential returns, traders will take on more risk than they predicted and or anticipate lower returns than they actually receive. One significant reason of financial crisis of 2008 is model risk. Financial institutions heavily relied on complex models to price mortgage-backed securities and other derivatives. However, these models often underestimated the risk of these derivatives which lead to great losses when the housing market collapsed.

3.3. Herstatt Risk

Herstatt risk refers to the risk that one party will deliver as per the contract but will not receive the counter-value [7]. It, also known as settlement risk, exists in foreign exchange and derivatives markets, in the futures and options markets, it arises from the time lag between the execution and settlement. When a future contract is executed, the party with profit is credited with this amount (market-to-market), but actual settlement of these funds, that is actual transfer of money, may not occur until later. This time difference can create a risk that one party becomes insolvent or defaults in the intervening period, leaving the other party at a loss. This risk is particularly relevant for OTC derivative transactions, which lack the standardized structure and clearinghouse guarantees of exchange-traded contracts. For option contracts, Herstatt risk is mainly relevant at the time of contract exercise. For example, in a call option, when the buyer decides to exercise the option, there can be a time lag from when the buyer pays the strike price to the seller and when the seller delivers the underlying asset to the buyer. If the seller defaults or becomes insolvent during the interval, the buyer is faced with losses, despite the obligation to fulfill their part of the contract.

4. Risk Management Strategies

Effective risk management is the key to mitigating the negative effects of these risks in future and option markets. Investors use a range of strategies to mitigate the various types of risk.

One of the most common strategies for mitigating risk is hedging, it is the taking of a derivative contract position, such as a future or an option, in order to offset potential losses in another position. An investor holding a portfolio of stocks, for example, may put options to hedge against declines in the stock market. Hence, the objective of hedging is not to make profits but to mitigate the risk of potential losses as much as possible [2].

In terms of credit risk, investors often use credit derivatives, such as credit default swaps (CDS), which protect investors from the default of their counterparties. Moreover, the introduction of central counterparty clearinghouses has significantly reduced counterparty credit risk in futures and options markets. Central counterparty clearinghouses act as the buyer to every seller and the seller to every buyer, they guarantee that two parties will fulfill their obligations about the contracts, thus the counterparty default risk can be mitigated [8].

Operational risk can be managed by robust internal controls establishing, contingency plans, and compliance procedures. The development of robust internal controls is the key to managing operational risk as it can prevent and detect process failures, system breakdowns, and human errors. For example, state-of-the-art IT systems for trading and risk management could be developed, which are updated and maintained on a regular basis to prevent system failures. They should have built-in redundancies to enable continuous operation in the event of a disruption to the system. There should be detailed procedures for every operation from trade execution to settlement to ensure consistency and to reduce the likelihood of mistakes. Furthermore, procedures should be updated regularly to

prevent some procedural errors. This may involve the implementation of standardized checklists, and the conduct of regular audits to ensure compliance. Finally, it is important for companies to have contingency plans which help them deal with disruptions when they occur. These plans could involve crisis management teams, disaster recovery plans, and so on.

Model risk refers to using inappropriate models when price contracts. Thus, it may be eliminated by using different models to cross-check results and comparing the assumptions and limitations of each model to find which model meet requestion most. Also, stress testing is helpful to understand the performance of a model under different market conditions [6]. Moreover, ongoing monitoring and testing models prior to use are also necessary, but all models are the simplification of reality and no model can capture information and be correct all the time. Finally, central counterparty clearing houses play a significant role in the management of the Herstatt risk for exchange-traded derivatives who are intermediaries between sellers and buyers and make sure both parties will fulfill their obligations to complete the transaction. For OTC markets, margin requirements, and collateral agreements can be used to prevent this risk. Moreover, Real-time settlement systems can also reduce the time lag between transaction and settlement, and reduce the probability of Herstatt risk [9].

5. Conclusion

In conclusion, the futures and options markets are very significant and offer many opportunities for market participants to make profits, but they are full of risks as well, from financial risks like liquidity, credit, equity prices, market risks to non-financial risks like operational, model, and Herstatt risks. It is important for investors to realize these risks and their negative effects and take action to hedge or mitigate these risks effectively so that their profits can be improved. When investors are faced with these risks, some strategies, such as hedging, robust internal controls, and credit derivatives can be used as a part of risk management. Although the futures and options markets are complicated and the risks are substantial, it is possible to make great profits with careful and comprehensive management. This paper did not provide specific examples or case studies when discussing risk management strategy, by introducing market data and cases can improve practicality and persuasiveness. Additionally, the article did not explore the interactions and influences between different types of risks. For example, liquidity risk and credit risk may sometimes be interconnected. Future research directions can focus on exploring how global financial crises and market shocks impact the futures and options markets.

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