Analysis of Systemic Financial Risk Based On Financial Derivatives

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Abstract: The financial crisis triggered by the subprime crisis in 2008 has made global financial markets frustrated, and it is necessary to examine the relationship between financial derivatives and systemic risks. This article uses financial derivatives as an entry point of view to analyze the role of financial derivatives in triggering systemic risks. Through research, it is found that financial derivatives are the key factors causing financial market volatility due to their structural complexity and leverage. And asset securitization and margin leverage have caused a downward spiral in asset prices, which in turn causes the expansion and spread of risks, forming systemic risks. For this reason, the article proposes to unify the supervision of financial institutions, improve the risk warning mechanism, and limit the scope of government regulation to prevent systemic risks.

1. Introduction

In 2008, the global financial crisis triggered by the US subprime mortgage crisis broke out on a large scale, and the global financial market was severely affected, and there were violent fluctuations. Currency liquidity had fallen sharply, commercial banks had run on them, and market demand had shrunk dramatically in just a few months. The economic growth rate of developed countries had fallen sharply, and the economic growth rate of developing countries had even shown a negative growth trend. Financial derivatives pose a huge challenge to systemic risks worldwide. Increasing systemic risks will inevitably damage the basic function of finance that it should offer service to real economy, so how to prevent systemic risks becomes particularly important..

2. Categories of Systemic Risks

Systemic risk refers to the uncertainty caused by risk factors such as economic cycles, changes in national macroeconomic policies, and external financial shocks. This risk is highly concealed, cumulative, and contagious. It will have huge negative externalities on the international financial system and the global real economy, and systemic risks cannot be offset by diversified investment.

According to the "Basel II" adopted by the Basel Committee on Banking Supervision on June 26, 2004, systemic risks can be divided into market risks, credit risks, liquidity risks and operational risks.

2.1. Market Risk

Market risk is also called price risk. It is usually the risk caused by the price changes of financial derivatives caused by adverse changes in the price of the underlying assets or sharp fluctuations. For example, when the price of a stock falls sharply, stock index options based on this stock will magnify investors' losses through leverage. The factors that cause market risk generally include natural environmental factors and social environmental factors. Among the natural environmental factors, natural disasters such as earthquakes and tsunamis will cause the price of basic assets to fall, which in turn will cause the price of financial derivatives to fall. In addition, changes in national policies and the alternation of political parties will also trigger market risks.

2.2. Credit Risk

Credit risk refers to the uncertainty of loss caused by the counterparty's failure to fulfill the agreement during the transaction. With the changes in the economic cycle, credit risk has a certain periodicity. When the economic situation is good, market participants have a large amount of cash flow, and the credit risk is relatively low; but when the economic trend declines, it will cause the break of cash flow of some investors in the market and make it impossible to conduct transactions as agreed. In turn, credit risk will arise. Although in modern market, many exchanges have a margin mechanism to avoid the occurrence of credit default events, with the continuous development of the financial market, the proportion of the OTC market is slowly increasing, and the occurrence of credit default events in the OTC market is also rising, and traders are facing serious credit risks.

2.3. Liquidity Risk

Liquidity risk refers to the risk of failing to obtain sufficient funds in a timely manner or failing to sell an asset at a reasonable price in the financial market. It is mainly divided into funding liquidity risk and trading liquidity risk. Funding liquidity risk refers to the risk that when a company wants to issue bonds for financing, it cannot issue bonds at a previously agreed price and can only issue bonds at a price lower than the fair price. And trading liquidity risk refers to the risk that when the company wants to sell its assets, it cannot be sold at a fair price. It generally occurs when the company needs to sell the assets in a short time to make up for the cash flow. In extreme cases, liquidity risks can cause financial institutions to fail. As for commercial banks, when many depositors withdraw money at the same time, there will be a run. Then the commercial bank is facing a liquidity crisis, which may lead to bank failure.

2.4. Operation Risk

Operation risk refers to the risk of accidental losses due to imperfect information systems or internal control mechanisms. Such risks are generally caused by human factors. In recent years, banking institutions have become larger and larger, financial derivatives have become more diversified and complicated, and banking businesses have become more and more dependent on the IT industry represented by computers. These all might generate some risks of human error in operation, and these risks will have extremely serious consequences in the global economic market.

3. Sources of Systemic Risk

3.1. Asset Securitization

Financial derivatives are financial products created by financial institutions to diversify risks and improve the liquidity of assets. They are highly dependent on cash flow. Once the cash flow breaks, systemic risks will affect all aspects of the financial market.[1] At present, the degree of economic globalization is deepening, and the development of asset securitization has made the financial industry and the connection between finance and the real economy more and more closed, which forms a complex network relationship. Risks in any of these links will seriously affect the security of the entire financial industry and even the entire macroeconomic.

Asset securitization refers to the process of packaging the basic assets into bonds and issuing bonds based on the cash flow generated by these underlying assets. In the traditional lending business of banks, banks have to wait for months or even years to recover loans, so the banks will face huge liquidity risks. However, asset securitization can enable banks to quickly recover funds and realize the separation and reorganization of asset returns and risks.

When SPV underwrite securitization products, the bank could withdraw the mortgage loan. Currently, the couple that the buyer regularly returns goes directly to the investor who purchases the products. The bank acts as a market maker in this process. The liquidity risk is transferred to investors who purchase mortgage-backed securities. In this way, banks will not carefully review the loan applicant's repayment ability during the lending process, which relax the loan review standards, generate many subprime loans, and fundamentally magnify the threat of systemic risks. The risk concealment of financial derivatives provides a natural protection for some institutions to conceal

the high risks of secondary mortgage assets, and its complex structure makes it difficult for regulatory agencies to manage. The process of asset securitization has extended the financial transaction chain, and the structure of financial derivatives has become more complex. Through packaging, segmentation, and combination, the virtual economic bubble has risen geometrically. At first, the loan of 1 dollar might be magnified to several tens of times. Then financial risks continue to accumulate and expand rapidly. Once the underlying assets cannot generate stable cash flow, it will cause many bond defaults and cause credit risk. Credit risk further expands, and investors start to run off bonds, which will cause a large area of liquidity risk, which in turn will cause a series of systemic risks such as market risk, resulting in superimposed effects and crisis of financial market stability.

3.2. Leverage Effect

A major feature of financial derivatives is high leverage. Most derivatives transactions are not for physical delivery, but acquire ownership of a certain underlying asset by paying a small margin. Investors in financial derivatives have established huge positions through leverage. When the price of the underlying asset changes a little, it will cause a sharp change in the principal. When the economy rises, high leverage brings huge benefits to investors, attracting more people to enter the market. However, when the economy is in recession, panic in the market will cause investors to sell assets, forming a herd effect and causing more people to sell assets. The liquidity crisis will trigger a cliff-like decline in prices, triggering systemic risks.

The drop in asset prices will cause the high-leverage funded account to trigger the liquidation warning line, and investors could only compulsorily liquidate the account assets due to the difficulty of accessing funds to fill the gap in the margin account. Forced liquidation will cause asset prices to fall further, which in turn will trigger a downward spiral in prices. For the overall financial market, based on the requirements of diversification of risks, general leveraged accounts usually hold multiple assets. Forced liquidation causes multiple assets in the account to be sold at the same time, resulting in increased liquidity demand for multiple assets, and decreased prices. At the same time, the same asset may be held by multiple accounts, and the drop in asset prices will cause different leveraged accounts to trigger the liquidation warning line. To sum up, when the above-mentioned spiral price decline forms a domino effect, the liquidity demand of the entire market rises sharply and a strong liquidity synergy occurs, which makes the entire secondary market liquidity disappear and causes systemic crisis.

4. Precautionary Advice

4.1. Unified Supervisory Functions

The derivatives market often involves securities, banks, insurance, and other financial institutions. The accumulation of systemic risks in any link will cause instability in the entire financial market. Therefore, it is necessary for the regulatory authorities to break the traditional independent regulatory model. They should supervise these financial institutions, and realize the full exchange of information to deal with the systemic risks in derivatives market. It is possible to establish a unified market supervision agency for financial products from spot, futures to derivatives, and it conducts unified management on the overall decision-making, market access and information disclosure to ensure the security and stability of financial market. In addition, the regulatory authorities cannot only monitor individual risks, but to prevent unilateral and single risks from spreading and transforming into multi-level, multi-group, and multi-variety systemic risks.

4.2. Improve Risk Early Warning Mechanism

The cash flow problems in any link of the financial derivatives chain will affect the security of the entire capital chain and threaten the security of the entire financial system. The early warning mechanism can solve the cash flow crisis when it is in a small range, preventing the spread of risks and the formation of systemic risks.[3] Therefore, the self-discipline early warning mechanism of

industry associations and financial derivatives exchanges should be strengthened. When the exchange finds trading loopholes or large-scale price drops that might cause margin account wear-out, it should promptly notify investors and regulatory authorities to be prepared to deal with risks. In this way, systemic risks could be prevented by detecting risks at the source of spread.

4.3. Limit the Scope of Government Regulation

The government's regulation of the derivatives market should be strictly limited to the areas of market failure. The normal performance of the basic functions of the financial derivatives market depends on an efficient, transparent, and competitive market mechanism. When the government wants to prevent and control risks, it should mainly focus on some market defects such as asymmetry of market information, market operation, deception of customers and the irrational instinct of market participants to "emphasize returns and light risks" to strengthen the market participants' risk awareness and improve market information transparency. It is important to give full play to the leading role of the market, and only allow the government to regulate and control where the market has defects. An efficient financial market environment can prevent systemic risks.

Conclusion

The high-risk and complex structure of financial derivatives can easily lead to systemic risks, and systematic risks will seriously affect the function of financial markets in serving the real economy. Therefore, it is necessary to control financial derivatives to prevent certain single risks from triggering complex systemic risks.

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