Original Research Article

Exploration of the two-way risk transmission and feedback mechanism between financial market and the real economy

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Abstract: This paper conducts an study on the relationship between financial market and the real economy, systematically exploring the methods of financial market risk analysis and prediction, risk management strategies, and the two-way interaction mechanism between them. In the field of risk analysis and prediction, research methods have evolved from traditional statistical models to machine learning and deep learning technologies. Although progress has been made in predicting market trends, challenges still remain in predicting extreme events and data application. Risk management strategies have gone through iterations from traditional theories such as the Capital Asset Pricing Model (CAPM) to modern models like Value at Risk (VaR) and Conditional Value at Risk (CVaR), and have formed segmented practices in the management of the electricity financial market, operational risks, and the global market. There is a close two-way interaction between the financial market and the real economy: financial market risks impact the real economy through fluctuations in interest rates and exchange rates; the state of the real economy, in turn, affects the financial market. The two form a vicious cycle through the risk transmission mechanism. Based on this, the paper proposes collaborative governance strategies such as constructing a dynamic risk monitoring system, innovating policy coordination mechanisms, strengthening the ability of finance to serve the real economy, and improving the risk isolation mechanism, aiming to enhance the stability of the financial market and promote a virtuous interaction and sustainable development between the real economy and the financial market.

Keywords: Financial market risks; Real economy; Two-way interaction relationship; Risk analysis and prediction; Risk management strategy; Collaborative governance; Risk transmission

1. Introduction

In the modern economic system, the financial market and the real economy form a complex and close symbiotic relationship. As a hub for capital financing and resource allocation, the financial market provides key support for technological innovation and industrial upgrading of the real economy through functions such as price discovery and risk management. The real economy, on the other hand, serves as the foundation of the financial market. The profits and values created by its production and operation activities provide a practical basis for the existence of financial products and services. However, this deeply integrated relationship also makes the transmission of risks between the two more rapid and hidden. Once the risks get out of control, it is extremely likely to trigger a systemic crisis. From the financial tsunami triggered by the bursting of the real estate bubble during the 2008 global financial crisis to the vicious cycle of the shutdown of the real economy and the shock of the financial market under the COVID-19 pandemic in 2020, all highlight that the two-way interaction of risks between the financial market and the real economy has become a core factor affecting global economic stability.

With the continuous deepening of financial innovation and the continuous advancement of economic globalization, the complexity and uncertainty of the financial market have significantly increased. New character-

istics such as the frequent occurrence of extreme events and the acceleration of risk contagion pose severe challenges to traditional risk analysis paradigms and management strategies. In this context, in-depth exploration of the methods of financial market risk analysis and prediction, risk management strategies, and their interaction mechanism with the real economy is not only a theoretical proposition that the academic community urgently needs to solve but also a practical demand for policymakers to maintain economic and financial security and achieve high-quality development. This paper will conduct research from three dimensions: financial market risk analysis and prediction, risk management strategies, and the two-way interaction relationship between them, aiming to reveal the laws of risk transmission, propose collaborative governance paths, and provide theoretical basis and practical references for preventing systemic risks and promoting a virtuous interaction between the economy and finance.

2. Analysis and prediction of financial market risks

2.1. Evolution of methods for financial market risk analysis and prediction

The analysis and prediction of financial market risks, as a core research direction in the financial field, is committed to providing decision-making support for investors, financial institutions, and policymakers through quantitative analysis. With the continuous increase in the complexity of the financial market, research methods have undergone significant iterative upgrades. Early studies mostly relied on traditional statistical methods such as linear regression and logistic regression. However, in the face of the nonlinear and high-dimensional characteristics of financial data, their limitations have become increasingly prominent. In recent years, the introduction of machine learning and deep learning technologies has brought new breakthroughs to this field: neural network models can effectively capture the complex laws of market price fluctuations with their powerful nonlinear fitting ability; support vector machines perform excellently in processing small samples and high-dimensional data. Time series analysis methods are also widely used. By modeling historical data, they can effectively capture the dynamic change patterns of market prices and thus predict future trends.

2.2. Challenges in predicting extreme events and data application

In the deepening process of risk analysis, the prediction of extreme events has become a key research direction. Małecka and Pietrzyk proposed a spectral test method based on the Anderson–Darling statistic. During periods of severe market fluctuations, such as the subprime mortgage crisis, the COVID-19 pandemic, and the Russia-Ukraine war, this method can more effectively identify the inaccuracies in VaR predictions. However, the current ability to predict extreme events still faces many challenges. Extreme events are rare and uncertain, and historical data is difficult to fully reflect their characteristics, resulting in large errors in models when predicting extreme events. In terms of data application, the adaptive method based on a hybrid strategy (HSB_RS) integrates multi-source heterogeneous data for risk prediction and improves prediction performance. However, some models rely too much on historical data, and their prediction accuracy will be affected when the market environment changes rapidly. Although the introduction of real-time data can alleviate this problem to a certain extent, the quality, timeliness of the data, and the difficulty of data integration all pose challenges to the construction and application of models.

2.3. Research and prospect of systemic risks from a macro perspective

In recent years, the analysis of financial market risks has gradually broken through the limitation of a single market dimension. The dynamic risk spillover network model constructed by Chen, Jin, and Xin (2024) measures the impact of systemic risks on the real economy from a macro perspective and reveals the transmission mechanism of risks among different economic sectors. This study shows that the analysis of financial market

risks needs to pay attention to both the internal fluctuations of the market and the cross-sectoral risk transmission. Although current research has achieved phased results, there is still room for optimization in improving the prediction accuracy of extreme events and reducing the dependence of models on historical data. Future research should focus on innovating model methods and deepening the integration and application of multi-source data to enhance the ability to analyze and predict complex risks in the financial market and maintain the stability of the financial market.

3. Risk management and response strategies in the financial market

3.1. Evolution of theories and models of financial market risk management

The development process of financial market risk management is a process of continuous iterative optimization of theories and practices. In the early days, the Capital Asset Pricing Model (CAPM) and modern portfolio theory laid the theoretical foundation for risk management. CAPM quantifies systemic risks through the β coefficient, provides a standardized framework for asset pricing, and helps investors weigh the relationship between expected returns and risks. Modern portfolio theory emphasizes diversifying non-systemic risks through diversified asset allocation to optimize portfolio configuration. However, with the increasing complexity and volatility of the financial market, these traditional theories are difficult to deal with complex risks such as nonlinearity and extreme events, and their limitations have become increasingly prominent.

Against this background, the Value at Risk (VaR) model emerged. It can quantify the maximum potential loss at a certain confidence level, providing risk managers with an intuitive and measurable risk indicator and making risk assessment more accurate and standardized. For example, in "Comparison of Value at Risk (VaR) Multivariate Forecast Models," Müller and Righi empirically found that different VaR prediction models perform differently under various market conditions, highlighting the key role of reasonable model selection in accurate risk assessment. However, the VaR model also has drawbacks, such as its inability to fully consider extreme loss situations. To make up for the shortcomings of the VaR model, the Conditional Value at Risk (CVaR) model has been further developed. It considers the conditional expectation of losses exceeding the VaR value, more comprehensively reflecting tail risks and helping financial institutions better deal with extreme market situations. In addition to these models, historical simulation methods and Monte Carlo simulation methods are also widely used. The historical simulation method evaluates risks by simulating past market changes based on historical data; the Monte Carlo simulation method more accurately evaluates risks by randomly simulating a large number of market scenarios, including extreme events, providing a more comprehensive basis for financial institutions to formulate risk response strategies.

3.2. Practical applications in segmented areas of risk management and global coordination strategies

In segmented market areas, risk management shows distinct industry characteristics. With the advancement of the goals of "carbon peaking" and "carbon neutrality," the reform of the electricity financial market has accelerated, and electricity financial derivatives have become important risk management tools. Feng et al.(2024) pointed out in "Developing China's Electricity Financial Market: Strategic Design of Financial Derivatives for Risk Management and Market Stability" that derivatives such as electricity futures, options, and contracts for difference can help market participants hedge against price fluctuations and stabilize their returns. For example, China can draw on international experience and, in the initial stage of the development of the electricity financial market, gradually introduce standardized and differentiated financial derivatives based on the electricity spot market to build a complete market system.

Regarding operational risks, Yang et al. (2017) proposed through dialogical action research that financial

institutions need to start from aspects such as organizational culture reshaping and knowledge management strengthening. By introducing relevant theories such as the SECI model (Knowledge Conversion Model) and the practice perspective theory, they promote the formation of a knowledge-based risk management culture in financial institutions and effectively identify and manage operational risks.

At the global financial market risk management level, Meng, S., & Chen, Y. (2023) used the R-Vine Copula and DY spillover index to reveal that there is a significant agglomeration characteristic in the volatility spillover of the global financial market, and developed European countries are at the center of the network with strong influence. Therefore, to prevent systemic risks, it is necessary to focus on the financial markets of key countries, alleviate the imbalance in market development, reduce market correlation, and cut off the cross-border risk transmission chain to maintain global financial stability.

4. The relationship between financial market risks and the real economy

There is a close and complex two-way relationship between financial market risks and the real economy. The two are interrelated and influence each other, forming a risk transmission closed loop through various channels and mechanisms.

4.1. The Impact path of financial market risks on the real economy

Financial market risks can have a significant impact on the real economy through various channels. Interest rates, as a key variable in the financial market, their fluctuations will directly change the financing costs of enterprises. Research shows that the adjustment of monetary policy will change the interest rate level, which will in turn affect the risk-taking behavior of banks, and this will be transmitted to enterprises. When interest rates rise, the loan costs of enterprises increase, and the willingness to invest and expand production decreases, which may lead to a slowdown in real economic activities. For example, in the 1980s, the United States adopted an aggressive interest rate hike strategy to curb inflation, and the federal funds rate once exceeded 20%. In a high-interest-rate environment, manufacturing enterprises were forced to cut production capacity due to the sharp increase in equipment renewal loan costs. General Motors suffered a cash flow break in 1982 due to rising financing costs, closed 11 factories, and laid off more than 70, 000 employees. Exchange rate fluctuations cannot be ignored either. For import and export enterprises, changes in exchange rates are directly related to their revenues. When the domestic currency appreciates, the prices of export enterprises' products in the international market relatively increase, their competitiveness decreases, and export revenues decrease; import enterprises may benefit from the decrease in import costs. However, in general, the uncertainty of exchange rate fluctuations will increase the operational risks of enterprises and affect the stable development of the real economy. For example, after the Plaza Accord, the Japanese yen appreciated sharply. From 1985 to 1988, the exchange rate of the Japanese yen against the US dollar changed from 240 yen per US dollar to 120 yen per US dollar. The export profits of enterprises such as Toyota Motor shrank by more than 30%, and the export growth rate of Japan's manufacturing industry dropped sharply from 10.2% in 1985 to 1.8% in 1987.

4.2. The feedback effect of real economy risks on the financial market

The development status of the real economy also has a reverse effect on the risk level of the financial market. The prosperity or recession of the real economy will change the profitability and solvency of enterprises, thereby affecting the risk status of the financial market. Ho, T. S. Y., & Lee, S. B. (2004) pointed that when the real economy develops well, the profitability of enterprises increases, the default risk decreases, the asset quality of financial institutions is guaranteed, and the financial market risks decrease accordingly. Conversely, if the real economy falls into recession, enterprises will face difficulties in operation, the default rate will rise, the

non-performing assets of financial institutions will increase, and the financial market risks will rise accordingly. For example, during the 2008 global financial crisis, the bursting of the real estate bubble triggered a recession in the real economy, a large number of enterprises went bankrupt, financial institutions faced huge bad debts, and the financial market risks increased sharply. In this financial crisis, Lehman Brothers Holdings Inc. held a large number of assets related to subprime mortgages. With the collapse of the real estate market, the value of its assets evaporated by 90%, eventually triggering a liquidity shortage in the global financial market, and the Dow Jones Industrial Average fell by a maximum of 9.9% in a single day. From 2015 to 2016, there was overcapacity in industries such as coal and steel in China, and the loss-making surface of the whole industry exceeded 40%. The non-performing loan ratios of relevant industries of state-owned banks such as Industrial and Commercial Bank of China and China Construction Bank rose from 1.2% to 4.3% and 3.8% respectively, resulting in a sharp drop in the risk appetite of financial institutions and an expansion of the credit spread in the bond market by 120 basis points.

4.3. There is also a risk transmission and feedback mechanism between the financial market and the real economy

According to the paper by Fan, R., Xie, X., Wang, Y., & Lin, J. (2025), through constructing a two-layer network game model, it is found that the formation of asset bubbles in the financial market is closely related to the interaction between the real economy and the financial sector. Shadow banking activities increase the contagion risk in the financial market, and the credit interaction and peer learning effects play a role in the network. When enterprises in the real economy excessively participate in financial market speculation, it may trigger asset bubbles. Once the bubbles burst, it will lead to the damage of the assets of financial institutions, which will in turn affect the stability of the financial market. The unstable financial market will further suppress the development of the real economy, forming a vicious cycle. For example, during the COVID-19 pandemic in 2020, the shutdown of the real economy and the shock of the financial market formed a spiral deterioration. Due to the suspension of flights, enterprises such as Delta Air Lines and American Airlines in the US aviation industry faced a cash flow shortage and were forced to issue high-yield bonds of more than 40 billion US dollars. The rise in credit risk led to panic in the bond market, and the spread of junk bonds once expanded to 1, 000 basis points, triggering four circuit breakers in the stock market. At the same time, the liquidity crisis in the financial market 反噬 the real economy through credit contraction. The rejection rate of loan applications from small and medium-sized enterprises increased from 35% in 2019 to 62% in 2020, forming a vicious cycle of "real economy shrinkage - financial tightening - real economy recession."

5. Collaborative governance strategies and risk mitigation paths between the financial market and the real economy

5.1. Constructing a dynamic risk monitoring system

Establish a real-time monitoring platform covering more than 30 core indicators such as the leverage ratio of the financial market and the debt coverage ratio of the real economy, and use machine learning algorithms to construct a risk early warning model. For example, the Macro Prudential Assessment System (MPA) developed by the People's Bank of China includes the concentration of real estate loans in the assessment through quarterly dynamic evaluations, effectively curbing the spread of real estate financial risks in 2021.

5.2. Innovating policy coordination mechanisms

Implement a three-dimensional policy toolbox of "fiscal + monetary + industrial" policies. Under the framework of Abenomics in Japan, the central bank's quantitative easing policy was coordinated with fiscal

infrastructure investment. From 2013 to 2019, public works expenditure increased by 23%, driving the manufacturing PMI to rise by 12 percentage points. At the same time, establish a financial stability committee to coordinate departments such as the China Banking and Insurance Regulatory Commission and the China Securities Regulatory Commission to achieve cross-field coordination of regulatory policies.

5.3. Strengthening the ability of finance to serve the real economy

Develop supply chain finance and achieve digital confirmation of accounts receivable through blockchain technology. Shenzhen Qianhai WeBank provides unsecured financing for small and medium-sized suppliers based on Tencent's supply chain platform. By 2023, the cumulative loan amount exceeded 80 billion yuan, and the non-performing loan rate was controlled below 1.2%. Promote green financial products. The Climate Awareness Bond issued by the European Bank for Reconstruction and Development raised 8.5 billion euros to support clean energy projects, effectively reducing the transformation risks of the real economy.

5.4. Improving the risk isolation mechanism

Establish a firewall system between financial institutions and real enterprises, and limit the concentration of bank loans to a single industry to no more than 15%. The German banking industry controls the regional concentration of local bank loans within 60% through the "decentralized regional operation" model. During the European debt crisis, the non-performing loan rate was only 3.1%, significantly lower than the average level of the eurozone. At the same time, strengthen the supervision of shadow banks, limit the nesting levels of asset management products to no more than two layers, and cut off the cross-market risk contagion path.

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