Frontiers in Business, Economics and Management
ISSN: 2766-824X | Vol. 9, No. 2, 2023

Research on the Spillover Effects of Systemic Risk in China's Financial Market on The Securities Industry

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Abstract: In recent years, with the increasing openness of China's financial market, continuous deepening of financial reforms, and growing financial innovation, the Chinese securities market has become increasingly complex, leading to a gradual increase in the probability of systemic risk. This study focuses on the daily closing prices of stocks from eight large-scale listed bond companies, including CITIC Securities and GF Securities, and incorporates the stock, currency, bond, foreign exchange, and real estate markets into the CoVaR model to analyze the spillover effects and transmission channels of these five markets on systemic risk in the securities industry. The empirical results indicate that the stock market, currency market, bond market, and foreign exchange market have significant negative spillover effects on systemic risk in the securities industry, while the real estate market has a positive spillover effect. The empirical results also suggest that among the transmission channels of spillover effects, the currency market exhibits the strongest risk volatility, individual securities companies have the highest sensitivity to changes in the stock market risk, and compared to the real estate market, the rich information content of the four financial sub-markets has a greater impact on the spillover effects of systemic risk in the securities industry.

Keywords: Financial markets, Systemic risk of securities industry, Spillover effect, △ CoVaR Model.

1. Introduction

Since the outbreak of the COVID-19 pandemic in early 2020, China has vigorously pursued a dual circulation development strategy, focusing on both domestic and international markets. The Chinese capital market has also accelerated its process of opening up to the outside world and undergoing internal reforms. Externally, the securities industry has lifted capital restrictions, abolished limits on foreign ownership ratios, and granted national treatment to foreign investors. Internally, the registration-based IPO system reform for the Growth Enterprise Market has been formally implemented, actively guiding capital flow towards the real economy.

The bold reforms in China's capital market have, on one hand, accelerated capital mobility and improved resource utilization efficiency. On the other hand, they have intensified competition among domestic financial institutions and increased risks associated with the reforms. Factors such as cross-border loans, investment networks, trade relationships, and supply chains have led to increasing interdependence within the existing economic system. Financial institutions such as banks, securities firms, trust companies, and insurance companies have increasingly intertwined their operations, leading to a more evident network structure within the entire financial system. The distress of a particular institution or market may evolve into a regional or global financial crisis, characterized by strong contagion and destructiveness, as exemplified by the collapse of Lehman Brothers marking the onset of the global financial crisis. The prevalence and high destructive nature of systemic risk have made it a focal point of attention for global financial regulatory institutions, scholars, and practitioners.

Due to the diversity, uncertainty, and interrelatedness of risk sources, systemic financial risk has become a complex phenomenon, posing significant challenges for prevention. As the securities industry is a key component of China's financial market and its interconnectedness with other financial sectors continues to strengthen, the risks it faces are growing. Therefore, conducting research on the systemic risk faced by China's securities industry can contribute to better preventing systemic risks in the Chinese financial system.

2. Related Work

In domestic and international research on systemic risk in the financial system, it can be classified into the following categories:

(1) Research on the meaning of systemic financial risk.

After the global financial crisis triggered by the 2008 U.S. subprime mortgage crisis, scholars have delved deeper into the study of systemic financial risk. Billio et al. (2012) argue that the interconnectivity between financial institutions leads to the easy transmission of losses and risks, giving rise to systemic risk. Zhu Yuanqian and Miao Yufeng (2012) believe that the outbreak of this financial crisis has provided a clearer definition and a fresh perspective on systemic risk. In addition to the impact on the financial system, the international community also emphasizes the impact of systemic risk on the real economy. Adrian and Brunnermeier (2016) suggest that systemic risk is the possibility of a widespread collapse of the financial system triggered by systemic events, and it exerts strong negative externalities on both financial markets and the real economy.

(2) Research on Systemic Risk in China's Securities Industry

Currently, some scholars in China have conducted research on systemic risk in the securities industry, with the CoVaR model being the main measurement method. Cao Yuanfang and Cai Zexiang (2015) used a time-varying CoVaR model to measure the systemic risk of both the securities industry and the banking industry, and found that the systemic risk in the securities industry was lower than that in the banking industry. She Xiaohe et al. (2019) measured systemic risk in the

securities industry from a tail dependence perspective by establishing various types of Copula models. In terms of risk spillover between the securities industry and other related industries, Shen Yue et al. (2014) constructed an extended GARCH-Copula-CoVaR model to measure the systemic risk contribution of banks, insurance companies, securities firms, and trust companies to the financial industry, as well as the degree of risk spillover among them. Yang Yang and Xu Hui (2018) studied risk transmission and spillover effects among the banking, securities, and insurance subsystems using static and dynamic CoVaR models. Yang Zihui et al. (2018) studied cross-sector contagion of financial risks in China using four measures: VaR, MES, CoVaR, and △CoVaR. They found that the real estate and securities sectors would become the central nodes of risk contagion in the event of a "circuit breaker" mechanism. Li Zheng et al. (2019) studied the systemic risk spillover effects among the securities, banking, and insurance industries in China using the up- and down-side △COES indicators, and pointed out that the securities industry is the main recipient of systemic risk. Zhou Liang (2021) also used the CoVaR model to study the risk spillover effects among different financial industries. The empirical results showed that the net spillover value of the securities industry would significantly increase during risk outbreaks, indicating a closer contagion of systemic risk within the securities industry.

(3) The Impact of the Real Estate Market on Systemic Financial Risk

International experience and extensive research have shown that real estate prices and real estate credit are important factors influencing financial system stability. In the early stages, Chinese scholars such as Wu Kangping et al. (2004) argued that both the real estate market and the financial market are important carriers of risk aggregation, and their symbiotic relationship leads to the positive accumulation of risks between the two markets. After the 2008 US subprime mortgage crisis, more scholars (Koetter and Poghosyan, 2010; Capozza and Order, 2011; Bai Hexiang, 2020) pointed out that the real estate market transmits risks to the financial market through the interaction of rising house prices and credit expansion, risk spillover across sectors after house price declines, and risk contagion among financial institutions based on bilateral debt structures. Since the initiation of housing system reforms in China in 1998, the Chinese real estate market has experienced significant growth, accompanied by continuous expansion of real estate credit. As a result, the linkages between the real estate market and the financial market have become increasingly close, posing potential risks to systemic risk in the securities industry. This indicates that when studying the spillover effects of the financial market on systemic risk in the securities industry, the real estate market as an important source of risk cannot be ignored.

(4) Literature Review

Currently, research in China on systemic financial risk in the financial market primarily focuses on systemic risk in the banking industry and the spillover effects of systemic risk between different financial sectors. There has been relatively less research on systemic risk in the securities industry. Existing literature has studied systemic risk in the securities industry and its spillover relationship with related industries, but it has not considered the spillover effects of the financial market on the securities industry. However, based on the operational practices of the Chinese financial system, the securities industry is an integral part of the financial system, and its risk conditions are not only influenced by risks within the securities industry but also by risks from other financial submarkets. Especially with the accelerated liberalization of China's interest rate market and exchange rate market, financial institutions hold assets and liabilities among each other through the stock market, money market, bond market, and foreign exchange market, creating closer linkages between China's stock market, money market, bond market, foreign exchange market, and the securities industry. Therefore, it is necessary to incorporate the securities industry into the broader financial system, including the financial market, in order to study not only the internal connections within the securities industry but also the spillover effects of the financial market on systemic risk in the securities industry.

3. Method

This study draws on the research of Fang et al. (2018) and introduces four financial submarkets (stock market, money market, bond market, foreign exchange market) as well as the real estate market as risk factors. It constructs a CoVaR model to examine systemic risk in the securities industry and further investigates the spillover effects of different financial submarkets on systemic risk in the securities industry. The aim is to provide quantitative references for better preventing and regulating systemic risk in the securities industry and enhancing the risk resilience of China's securities industry.

(1) Conditional Value-at-Risk (CoVaR) Theory

The CoVaR method is an extension of the Value-at-Risk (VaR) method. The VaR method only measures the maximum loss of an individual institution at a certain confidence level without considering the risk spillover effects among financial institutions, which has certain limitations. Therefore, Adrian and Brunnermeier (2016) proposed the CoVaR method, which allows for interconnections among financial institutions. It measures the maximum loss faced by another financial institution or the entire financial market when one financial institution experiences distress or failure.

(2) Measurement of Systemic Risk in the Securities Industry

Building upon the CoVaR (Conditional Value-at-Risk) model proposed by Adrian and Brunnermeier (2016), this study introduces various financial market returns as state variables for improvement. Firstly, the systemic loss rate in the securities industry (System_t, negative values of returns) is taken as the dependent variable, while the individual securities institution's loss rate (X_(i,t), negative values of returns) is taken as the explanatory variable. A quantile regression model is constructed at the q% quantile level. The specific form is as follows:

$$system_t^q = \alpha_i^q + \delta_i^q X_{i,t} + \sum_{k=1}^{5} \beta_{i,k}^q M_{k,t} + \varepsilon_{i,t} \quad (1)$$

Where M_(k,t) represents the fundamental state variables of the k-th market, where $k \in \{1, 2, 3, 4, 5\}$, referring to the stock market, money market, bond market, foreign exchange market, and real estate market. Meanwhile, i refers to the i-th securities institution.

$$CoVaR_{i,t}^q = \hat{\alpha}_i^q + \hat{\delta}_i^q VaR_{i,t}^q + \sum_{k=1}^{5} \hat{\beta}_{i,k}^q M_{k,t} \quad (2)$$

Where the symbol " ∧ " represents the estimated parameter values. To measure the spillover effects of financial markets on systemic risk in the securities industry, this study draws on the research by Fang et al. (2018). It considers the fundamental state variables of financial sub-markets and the real estate market as the dependent variables, with a constant term as the explanatory variable in quantile regression. Additionally, a fixed window of 120 trading days is selected for dynamic estimation. By incorporating the risk state variables of financial markets and the real estate market, the conditional value-at-risk (CVaR) for the securities industry, considering the risk values of individual securities institutions and the risk state variables of specific markets, can be obtained by substituting them into equation (2).

$$CoVaR_q^{s|\forall VaR^q_{M_{k,t}} \& VaR^q_{i,t}} = \hat{\alpha}_i^{q} + \hat{\delta}_i^{q} VaR_{i,t}^{q|\forall VaR^q_{M_{k,t}}} + \sum \hat{\beta}_{i,k}^{q} VaR^q_{M_{k,t}} \quad (3)$$

The left side of the equation represents the systemic risk of the securities industry when all four financial sub-markets and the real estate market are under stress, and the individual securities institution i is also under stress. Furthermore, when the four financial sub-markets and the real estate market as a whole transition from a normal state to a risk state, and the individual securities institution transitions from a normal state to a stress state due to changes in the risk state of financial markets and the real estate market, the contribution of the changes in the risk state of financial markets and the real estate market to the systemic risk of the securities industry can be expressed as follows:

$$\Delta CoVaR^*_{i,t} = CoVaR_q^{s|\forall VaR^q_{M_{k,t}} \& VaR^q_{i,t}} - CoVaR_q^{s|VaR^{50}_{M_{k,t}} \& VaR^{50}_{i,t}} \quad (4)$$

Finally, the contribution of individual securities firms to the systemic risk of the securities industry is weighted by their proportion of total asset value, resulting in a weighted average. This approach considers the relative size effect of securities firms and provides a measure of the systemic risk of the securities industry that takes into account the scale of individual securities firms.

$$\Delta CoVaR^*_i = \sum_{i=1}^{5} \frac{A_{i,t}}{\sum A_{i,t}} \Delta CoVaR^*_{i,t} \quad (5)$$

(3) Measurement Model for Spillover Effects of Individual Financial Sub-markets

When a specific financial sub-market or the real estate market and an individual securities firm are both in a risk state, the systemic financial risk of the securities industry can be expressed as:

$$CoVaR_{i,t}^{VaR^q_{M_{j,t}} \& VaR^q_{i,t}} = \hat{\alpha}_i^{q} + \hat{\delta}_i^{q} VaR_{i,t}^{q|VaR^q_{M_{j,t}}} + \hat{\beta}_{i,j}^{q} VaR^q_{M_{j,t}} + \sum_{k \neq j} \hat{\beta}_{i,k}^{q} M_{k,t} \quad (6)$$

Furthermore, when an individual market and an individual securities firm transition from a normal state to a risk state, they generate a spill-over effect on the systemic risk of the securities industry. This spill-over effect can be represented as:

$$\begin{aligned} M_k \Delta CoVaR^*_{i,t} &= CoVaR_{i,t}^{VaR^q_{M_{k,t}} \& VaR^q_{i,t}} - CoVaR_{i,t}^{VaR^{50}_{M_{j,t}} \& VaR^{50}_{i,t}} \\ &= \hat{\delta}_i^{q} (VaR_{i,t}^{q|VaR^q_{M_{k,t}}} - VaR_{i,t}^{50|VaR^q_{M_{k,t}}}) + \hat{\beta}_{i,j}^{q} (VaR^q_{M_{k,t}} - VaR^5_{M_{k,t}}) \end{aligned} \quad (7)$$

Finally, by applying market value weighting, we can obtain the spill-over effect of an individual financial market or the real estate market on the systemic risk of the securities industry as:

$$M_k \Delta CoVaR^*_i = \sum_{i=1}^{n} \frac{A_{i,t}}{\sum A_{i,t}} \left[\left(VaR_{i,t}^{q|VaR^q_{M_{k,t}}} - VaR_{i,t}^{50|VaR^{50}_{M_{k,t}}} \right) + \hat{\beta}_{i,j}^{q} \left(VaR^q_{M_{k,t}} - VaR^{50}_{M_{k,t}} \right) \right] \quad (8)$$

4. Data Source and Variable Description

(1) Data Source

This study selected the closing prices of eight A-share listed securities firms as the sample for research. In order to fully investigate the impact of rapidly developing securities firms on the securities industry in recent years, this study selected the top eight securities firms in terms of market capitalization in 2020 as the research objects. Specifically, they are CITIC Securities, Huatai Securities, Guotai Junan, China Merchants Securities, Shenwan Hongyuan Securities, Haitong Securities, GF Securities, and Galaxy Securities. The sample period is from July 1, 2016, to June 30, 2021, with a total of 1215 trading days. The sample data is sourced from the Tonghuashun database and Guotaian database.

Table 1. List of variables

Variable type	Variable symbol	Variable Name	Variable interpretation
Basic state of financial markets	M_1	Stock Market status	Csi 300 index loss rate
	M_2	State of the Money Market	Shanghai overnight interbank lending rate loss rate
	M_3	State of the Bond Market	In the bond composite index loss rate
	M_4	Foreign Exchange Market Status	Loss rate of RMB/USD central parity rate
Basic state of the real estate market	M_5	State of the Real Estate Market	Shanghai real estate index loss rate
Basic state of individual securities	$X_{i,t}$	Market status of monovalent securities	Rate of loss in the closing price of a single security stock
Basic state of securities industry system	$system_t$	Securities industry system loss rate	Market capitalization weighted loss rate of sample securities firms

(2) Variable Description and Descriptive Statistics Analysis

To study the systemic financial risk of the sample securities firms and their spillover effects, this study selected the

individual securities firm's loss rate and the securities industry's systemic loss rate as dependent variables. Since this study focuses on the spillover effects of the stock market, money market, bond market, foreign exchange market, and real estate market on the securities industry, representative data from these five markets are selected as state variables to measure the systemic risk of the securities industry and its spillover effects. Specific data indicators are shown in Table 1. Regarding the sample frequency, the individual securities firm's loss rate, the securities industry's systemic loss rate, and the state variables of different markets are all daily frequency. Additionally, the normal state and risk state in this study are defined as the 50th percentile level and the 95th percentile level, respectively.

Table 2 provides the descriptive statistics of the eight major securities firms and the securities industry's loss rate series. From the table, it can be observed that the mean of the loss rate series for each securities firm and the securities industry fluctuates around 0 and is greater than 0. The standard deviation hovers around 2.5, and the kurtosis of the loss rate series is greater than 3, indicating a typical "leptokurtic" distribution with heavy tails.

Table 2. Results of descriptive statistics

	Mean	Standard deviation	Variance	Minimum	Maximum	Skewness	Kurtosis
Citic Securities	0.0005	2.3605	5.7100	- 9.5617	10.5631	0.1954	8.5320
Guotai Junan	0.0462	2.2600	5.2100	- 9.5511	10.5489	0.4559	9.1210
Haitong Securities	0.0401	2.2558	5.0200	- 9.6012	10.5501	0.1302	8.7990
Huatai Securities	0.0120	2.5795	6.3200	- 9.5713	10.5631	0.0365	7.1996
Gf Securities	0.0278	2.3631	6.0100	- 9.5497	10.5701	0.2587	8.6643
China Merchants Securities	0.0058	2.3590	5.5800	- 9.5503	10.5500	0.1603	7.9985
Shen Wanhongyuan	0.0701	2.0988	4.7100	- 9.6352	10.5699	0.5500	10.4298
Galaxy Securities	0.0526	2.4987	6.4400	- 9.5563	10.5456	0.1297	7.7154
Securities industry	0.0231	2.3065	4.9700	- 9.5423	10.5378	0.2189	9.1378

Table 3. Descriptive statistics of loss rates in financial markets and real estate markets

	Mean	Standard deviation	Variance	Minimum	Maximum	Skewness	Kurtosis
Stock market	0.0061	1.512	2.1392	- 6.1059	9.0988	1.0645	10.0124
Money market	- 0.0301	7.990	73.8743	- 103.7852	40.9766	- 2.6709	29.9564
The bond market	- 0.0182	1.8721	0.0061	- 0.6437	0.6756	- 0.1097	20.0024
Foreign exchange market	- 0.0133	0.2301	0.0499	- 1.7956	0.9009	- 0.7789	9.6355
Real estate market	- 0.0189	1.8021	3.4338	- 9.9921	8.2768	- 0.7312	8.9854

Table 3 presents the descriptive statistics of the loss rate series for the four financial markets and the real estate market. Looking at the average values, among the five markets, only the stock market has a positive loss rate, while the other three financial markets and the real estate market have negative loss rates. This suggests that the stock market, since transitioning from a bull market to a bear market in 2015, has been relatively weak overall, with slight losses, while the other three financial markets and the real estate market have generally shown slight profitability.

In terms of standard deviation, the loss rate volatility is most significant in the money market, while the foreign exchange market has the lowest volatility, which can also be observed from the maximum and minimum values. Additionally, the loss rate in financial markets also exhibits the "leptokurtic" characteristics with heavy tails.

(Note: The reference to "Table 1" in the explanation refers to a table that is not included in the provided context. Please refer to the original source or document for the specific data indicators mentioned.) (2) Appropriately weaken the significance of traditional Chinese embroidery patterns

5. Empirical Process and Result Analysis

(1) Analysis of the spillover effect of systematic risk in the securities industry

Table 4 presents the average spillover effects of individual securities firms on systemic risk in the securities industry when all four financial markets and the real estate market are in a risk state, as well as when a single market is in a risk state. Furthermore, a market-value-weighted approach is applied to obtain the average spillover effects of the financial markets and real estate market on systemic risk in the securities industry. From Table 4, it can be observed that the systemic risk spillover effect in the securities industry is 0.0181, indicating that simultaneous changes in the risk states of the four financial markets and the real estate market exacerbate the overall systemic risk in the securities industry. However, when the risk states of the financial markets and real estate market change simultaneously, China Securities and Haitong Securities have a negative contribution to the systemic risk in the securities industry. Considering that China Securities has been expanding its operational scale through acquisitions and mergers, and Haotong Securities is a leader in China's securities industry international business, they can be considered "systemically important financial institutions"

based on the guidance issued by the People's Bank of China, China Banking and Insurance Regulatory Commission, and China Securities Regulatory Commission in late 2018 to improve the supervision of systemically important financial institutions. Therefore, this study suggests that the risk fluctuations of these two securities firms serve as early warnings. Once there is an increase in the volatility of institutional risk fluctuations, the influence of their early warnings makes it easier to attract attention from the entire securities industry, prompting regulatory authorities to strengthen risk supervision. As a result, the overall risk volatility in the securities industry is reduced.

For individual financial markets, the spillover effects of the stock market, money market, bond market, and foreign exchange market on systemic risk in the securities industry are all negative. Among them, the negative spillover effect of the foreign exchange market is the most pronounced, as evident from Table 4, mainly due to the significant systemic risk spillover effect of Haotong Securities. As mentioned earlier, Haotong Securities, as a leader in China's securities industry international business, has made international business a significant source of company revenue and possesses rich risk management experience. Therefore, when there are changes in risk states in the foreign exchange market, Haotong Securities is better able to reduce systemic risk in the securities industry compared to other securities firms.

Table 4. Mean value of spillover effect of systematic risk in securities industry

	$\Delta CoVaR^*$	$M_1\Delta CoVaR^*$	$M_2\Delta CoVaR^*$	$M_3\Delta CoVaR^*$	$M_4\Delta CoVaR^*$	$M_5\Delta CoVaR^*$
		Stock Market	Monetary market	Bond market	Forex market	Real estate market
Citic Securities	- 0.0299	- 4.5598	- 0.8399	- 5.9789	- 8.3290	6.4600
Guotai Junan	0.0162	- 4.2110	- 0.5405	- 4.7201	- 2.3019	6.6098
Haitong Securities	- 0.0377	- 3.9603	- 0.4987	- 3.7120	- 13.0097	3.4892
Huatai Securities	0.0299	- 4.2375	- 0.9843	- 5.6798	- 1.9100	7.3009
Gf Securities	0.0015	- 4.2560	- 0.4609	- 3.3775	- 2.7551	3.9778
China Merchants Securities	0.0603	- 4.2661	- 0.8499	- 4.9210	- 2.8753	7.5536
Shen Wanhongyuan	0.0657	- 4.0629	- 0.3631	- 3.7918	- 3.4421	3.0998
Galaxy Securities	0.1400	- 4.4601	- 0.4078	- 5.8201	- 6.0189	6.2109
Securities industry	0.0181	- 4.3398	- 0.6387	- 4.7214	- 5.4669	5.5502

Table 5. Sensitivity of the risk of a single securities company to the financial market

	Stock Market	Monetary market	Bond market	Forex market	Real estate market
Citic Securities	- 2.6022	- 2.2109	- 2.1999	- 2.1931	- 2.1324
Guotai Junan	- 2.2839	- 1.9521	- 1.9754	- 1.9879	- 2.1000
Haitong Securities	- 2.5790	- 2.2010	- 2.2641	- 2.3091	- 2.2531
Huatai Securities	- 3.0932	- 2.5775	- 2.7003	- 2.5983	- 2.4465
Gf Securities	- 2.6402	- 2.1208	- 2.1499	- 2.2165	- 2.1322
China Merchants Securities	- 2.7212	- 2.5009	- 2.500	- 2.5003	- 2.4278
Shen Wanhongyuan	- 2.2399	- 2.0879	- 2.0428	- 2.0051	- 1.9956
Galaxy Securities	- 3.1289	- 2.9980	- 2.8990	- 1.8991	- 2.6521

On the other hand, the change in risk state in the real estate market has a positive spillover effect on systemic risk in the securities industry. This may be because when the real estate market experiences significant fluctuations due to fluctuations in housing prices and imbalances in supply and demand, investors may choose other financial products for investment due to substitution effects. As an intermediary, securities firms increase their business scale and product variety accordingly, leading to an exacerbation of the systemic risk level in the securities industry.

(2) Channel analysis of the spillover effect of financial market on the systematic risk of securities industry.

According to equation (7), it can be inferred that the spillover effects of individual financial markets on securities firms can be analyzed through three channels: the risk of the financial market itself, the sensitivity of individual securities firms' risk to the financial market, and the information spillover channel from the financial market to systemic risk in the securities industry.

1. Analysis of the Changes in Financial Market Risk

During the period from 2015 to 2020, the risk control in China's bond market and foreign exchange market was relatively good, with minimal risk fluctuations. This is mainly because the Chinese bond market mainly consists of safe and highly liquid bonds, such as government bonds and financial bonds, which contribute to the stable operation of the bond market. Additionally, the foreign exchange market in China operates under a managed floating exchange rate system, and international investment activities have not yet become systematic, leading to effective risk control and minimal risk volatility.

The stock market and real estate market also experienced relatively small risk fluctuations, which further contracted after 2015. This indicates that China's financial risk regulation efforts have been effective following the stock market crisis in 2015. The currency market exhibited the highest risk volatility. With the continuous opening up of China's financial market and the ongoing improvement of interest rate liberalization, the transmission mechanism in the currency market has become more unobstructed. The interest rates in the Chinese currency market are increasingly influenced by both domestic and international economic conditions. Particularly after 2016, events such as Brexit, the US-China trade friction, and the COVID-19 pandemic have intensified the risk volatility in China's currency market.

2. Analysis of the Sensitivity of Individual Securities

Companies' Risk to Financial Markets

The sensitivity of individual securities companies' risk to financial markets can be calculated to reflect the extent to which the risk status of securities companies changes with the changing risk status of individual financial market segments. Table 5 presents the average degree of change in the risk status of securities companies when the risk status of individual financial market segments and the real estate market changes. It can be observed that all four financial market segments and the real estate market have a negative impact on the risk status of individual securities companies. This indicates that when the risk volatility increases in the four financial market segments and the real estate market, the risk volatility of securities companies tends to decrease. Among them, individual securities companies are most sensitive to the stock market.

This study believes that financial markets serve as signals for securities institutions, and their risk fluctuations act as early warnings for the overall risk changes in the capital market. At such times, securities companies proactively control risks by adjusting their business and asset structures, thereby reducing risk volatility.

Table 6. Impact of financial market risk volatility on spillover effect

	Stock Market	Monetary market	Bond market	Forex market	Real estate market
Citic Securities	0.5287	0.2439	2.4166	4.6982	- 3.5483
Guotai Junan	0.3199	0.1897	1.6702	1.0501	- 3.1092
Haitong Securities	0.3200	0.1421	1.1301	5.0499	- 3.1731
Huatai Securities	0.2798	0.2600	1.9110	0.7102	- 3.4998
Gf Securities	0.3667	0.1071	0.9178	1.2310	- 1.9765
China Merchants Securities	0.3769	0.2517	1.6287	1.0301	- 3.5999
Shen Wanhongyuan	0.3701	0.0801	0.8431	1.6447	- 1.3879
Galaxy Securities	0.5459	0.1430	1.6780	1.9211	- 2.3503

3. Analysis of the Information Spillover Channels of Financial Markets on Systemic Risk in the Securities Industry

This analysis examines the impact of risk fluctuations in individual financial market segments on the spillover effect of systemic risk in the securities industry. From Table 6, it can be observed that the coefficients for the stock market, money market, bond market, and foreign exchange market are all positive, indicating that the risk fluctuations in these four financial market segments have a positive spillover effect on systemic risk in the securities industry. On the other hand, the coefficient for the real estate market is negative, indicating that the risk fluctuations in the real estate market have a negative effect on risk spillover in the securities industry. When the risk in the real estate market increases, the spillover effect of risk in the securities industry decreases.

From the perspective of information spillover channels, this study suggests that this may be because compared to the four financial market segments, the real estate market has lower trading activity and lower frequency of market price fluctuations, resulting in relatively less information being incorporated. Therefore, the abundant information in the stock market, money market, bond market, and foreign exchange market has a greater impact on the spillover effect of systemic risk in the securities industry.

6. Conclusion

Discussing the spillover effects of financial markets on systemic financial risk in the Chinese securities industry can help us understand the generation of systemic risk in the securities industry and further stabilize the Chinese financial markets. This study focuses on eight listed securities institutions such as CITIC Securities and Guotai Junan and incorporates the stock market, money market, bond market, foreign exchange market, and real estate market into the conditional value-at-risk model to analyze the spillover effects of financial markets on systemic risk in the Chinese securities industry. The empirical results show that:

(1) The stock market, money market, bond market, and foreign exchange market have negative spillover effects on systemic risk in the securities industry, while the real estate market has a positive spillover effect on systemic risk in the securities industry.

(2) Among the channels through which financial markets transmit spillover effects on systemic risk in the securities industry, the money market exhibits the highest risk volatility. Single securities firms show the strongest sensitivity to changes in the stock market risk. Compared to the real estate market, the abundant information in the stock market, money market, bond market, and foreign exchange market has a greater impact on the spillover effects of systemic risk in the securities industry.

Based on the conclusions drawn and considering the current development situation in China, this paper proposes the following recommendations:

First, managing systemic risk in the securities industry can start by focusing on financial markets. Regulatory authorities should not only pay attention to the internal risk contagion within the securities industry but also closely monitor the risk trends in financial markets and the real estate market, especially the changes in real estate market risk. This will help reduce systemic risk in the securities industry. Additionally, regulatory authorities can establish financial firewalls to prevent rapid contagion of financial risks across different industries.

Second, continuous attention should be given to the risk situation of securities firms. Regulatory oversight should be timely and comprehensive, considering factors such as asset size and business interconnections. Key focus should be placed on controlling prominent business risks, such as the international operations of securities firms like Haitong Securities. Proactive measures should be taken to address violations, evasion of regulations, and other misconduct by securities firms. Efforts should be made to enhance the professionalism of Chinese securities firms, improve their corporate governance practices, and standardize their institutional arrangements in areas such as corporate governance, internal controls, and risk management. This will strengthen their risk resilience and help prevent the occurrence of systemic financial risks in China.

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