

Global risk aversion and US corporate default risk premium

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Abstract. In recent years, the default rate of China's bond market has been increasing. In addition to domestic factors, the contagion of external risks may also lead to changes in China's bond market. Therefore, this paper further explores the transmission mechanism of financial risk by studying the impact of global risk index on Chinese corporate bond default. Specifically, the paper uses the VIX index to measure global risk aversion and the spread between Moody's corporate bonds and the Fed funds rate to measure default risk. This study finds that a one percentage point change in the VIX index can lead to a 2.3802 percentage point increase in the risk premium for US companies. This shows that the global risk aversion sentiment can spread the risk to the real economy. The research of this paper provides certain reference significance for preventing financial risks.

Keywords: Global risk aversion; US corporate default; financial risk; risk premium.

1. Introduction

In the financial markets, the CBOE Volatility Index or VIX for short, is a measure of the market's anticipation of the magnitude of price movements in the S&P 500 over the next 30 days based on a market index that is updated in real-time. A term that is used to describe this is volatility. This represents how much investors believe the S&P 500 Index is most likely to fluctuate over the next 30 days. Based on a combination of the weighted prices of the index's put and call options over the next 30 days, it is calculated. An asset can be put on the market at a predetermined price and for a predetermined period under a put option. Call options offer the buyer the opportunity to purchase a security at a predetermined price and at a specific time. In making investment decisions, investors use the VIX to determine the level of risk, anxiety, or tension in the stock market. The VIX is a tool that indicates the level of fear or stress in the stock market. In addition to the premium on an option, investors may also use the premium as a measure of perceived market risk; the greater the perceived level of market risk, the greater the amount of money they will spend on options as a means of protection. When investors anticipate substantial increases or decreases in stock prices, they utilize options to "hedge" their positions. An investor can hedge their existing stock position by purchasing an option, which allows them to take the opposite position. The VIX will increase, signaling to investors that market volatility may increase due to increasing option prices. This indicates a more significant degree of market uncertainty and therefore higher predicted volatility. A rise in the VIX indicates an increase in market volatility in the S&P 500 options market, and a decrease in the VIX indicates a decrease in market volatility. Over a long period of time, the VIX averages approximately 21. Market anxiety and volatility are frequently associated with bear markets when the VIX reaches high levels (often above 30).

The media reported that 75 companies around the world had defaulted on debt during the financial crisis, representing a total of \$226 billion. This is a significant increase over the 22 defaults that occurred in 2007. The majority of 65 companies were U.S.-based (Standard & Poor's). Additionally, American companies dominate the list of "weakest links," which are either on review for a possible downgrade or have a negative outlook. This indicates that these companies are at a greater risk of defaulting. There are a total of 140 U.S. companies out of 181 weak links. A total of \$388.52 billion is the combined rated debt of all 181. Standard & Poor's noted that defaults have increased significantly in 2008 in the United States, but have remained scarce elsewhere. A ninth consecutive month of increases in the speculative-grade default rate has taken place in the United States since August, when it rose to 2.68 percent from 2.44 percent. There will continue to be an elevated level of

high-yield spreads in the coming quarters as a result of continuing uncertainty in financial markets, a weakening economy, and increased default expectations. [1]

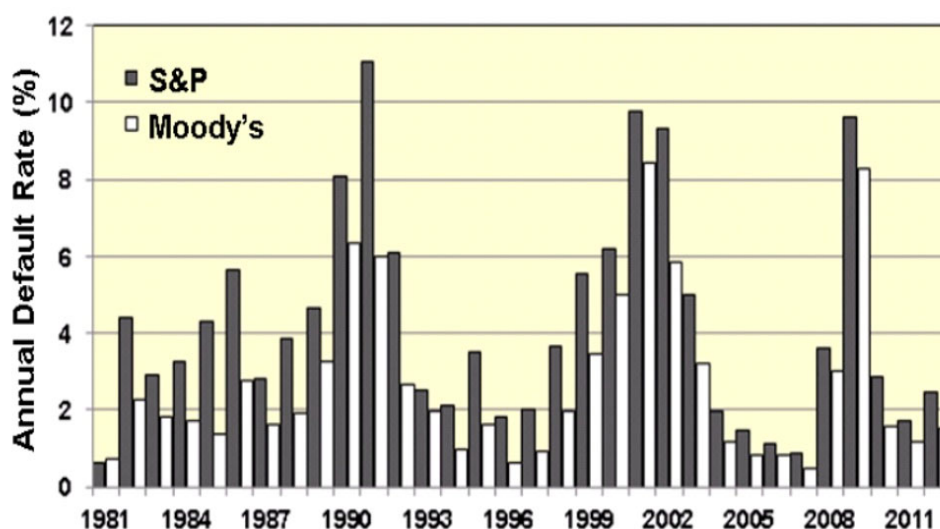


Fig. 1 Annual trailing 12-month default rates from standard & poor and Moody's

As shown in Figure 2, Standard & Poor's and Moody's have published annual default rates for all firms and for high-yield firms only. Although Standard & Poor's default rates appear to be slightly higher than those reported by Moody's, they tend to rise and fall in tandem. As can be seen from the graph, the annual default rate increased dramatically in 2008 when the financial crisis occurred.

In order to test whether the global risk aversion will affect the US corporate default risk premium, the VIX index is selected as the index to measure the global risk aversion, and the difference between Moody's corporate bond and federal funds rate is used to measure the corporate default risk premium. On this basis, this paper establishes the ordinary least square regression model to test the relationship between the two time. The study found that global risk aversion can spread risk to the real economy, with a one percentage point change in the VIX index resulting in a 2.3802 percentage point increase in the US corporate risk premium.

The rest of this article is arranged as follows. The second part is a literature review. This paper reviews the related researches on VIX index and financial risks, and then carries out the research on this basis. The third part is the introduction of the model method, namely the least squares estimation method and the selected variables and their data sources. The fourth part shows the main research results of this paper, and the last part is the summary.

2. Literature Review

A growing amount of attention has been paid to the transmission of financial risks from the financial sector to the real economy following the financial crisis. From the perspective of existing studies, scholars' studies on global risk aversion focus on the post-2008 financial crisis. Some scholars believe that global risk aversion is an important factor driving the global financial cycle, and focus on how global risk aversion affects the global financial environment.

We decompose the squared VIX, into two components, the conditional (physical) variance of the stock market (CV) and the equity variance premium (VP). CV predicts economic activity robustly and significantly, whereas VP does not have the ability to predict future output growth. Finally, CV shows a relatively higher predictive power than variance premium for predicting financial instability.[2] Binxia Chen and Yanlin Sun suggested that there is a non-linear Granger causal relationship exists between the US financial volatility index (VIX) and Chinese financial markets and the financial volatility in the US markets can spread more rapidly to China's financial markets A major risk event occurs, such as the global financial crisis, when a large amount of risk is involved.

[3] Cheuathonghua, M., Padungsaksawasdi, C., Boonchoo and P., & Tongurai, J. suggested that from 1998 to 2014, the impact of VIX spillovers on 42 international equity markets was examined. Specifically, tail cross-dependence suggests that in volatile markets, even minor changes in the VIX have significant effects on global market operations. It is particularly evident that VIX has asymmetrical effects when markets are negatively skewed, extremely volatile, and low in volume [4]. Ruan, L uses ST-VCopula to examine the relationship exists between the VIX index and the stock markets and suggested that they are significantly correlated [5].

By examining ten stock market segments from 25 prominent developed and developing stock markets, this study examines the effects of the Global Financial Crisis of 2007-2009 on the actual economy. This study concludes by examining numerous channels of financial contagion across nations and industries that the financial crisis influenced the co-movement of returns between financial sector stocks and real economy equities, as well as between financial sector stocks across nations. Considering the negative effects of the crisis on every country and industry, portfolio diversification is ineffective. [6]. During the global financial crisis, there has been an increase in co-movement between the financial sectors of various countries or regions and the global financial sector, as well as between the financial sectors and the real economy sectors. [7]

An equilibrium phenomenon is used to model financial contagion. In an imperfect world, banks hold inter-regional claims on each other's' banks in an attempt to protect themselves against liquidity preference shocks, which are imperfectly varying across regions. A risk-sharing allocation based on the first-best criterion can be achieved when there is no overall uncertainty. There is, however, a financial risk associated with this arrangement. The impact of small changes in liquidity preferences can be felt throughout the economy as a whole. For there to be any likelihood of spreading, the structure of inter-regional claims must be full to a large extent. It has been demonstrated that complete claims structures are more reliable than incomplete ones [8].

To sum up, although the existing literature has been rich, there is relatively little research on how VIX affects corporate default risk premium. This paper focuses on the impact of global risk aversion on corporate default risk and empirically tests the transmission of risk from the financial sector to the real sector.

3. Data and Methodology

In this paper, VIX index was selected to measure the global risk aversion sentiment, and the difference between Moody's corporate bonds and the federal funds rate was used to measure the default risk. The duration of the variable was from January 2008 to December 2017, and the data came from the WIND database. Figure 1 shows the time series changes of the two variables. As can be seen from the figure, there is a high correlation between the changes between the two. With the rise of global risk aversion, the default risk premium of American enterprises also rises.

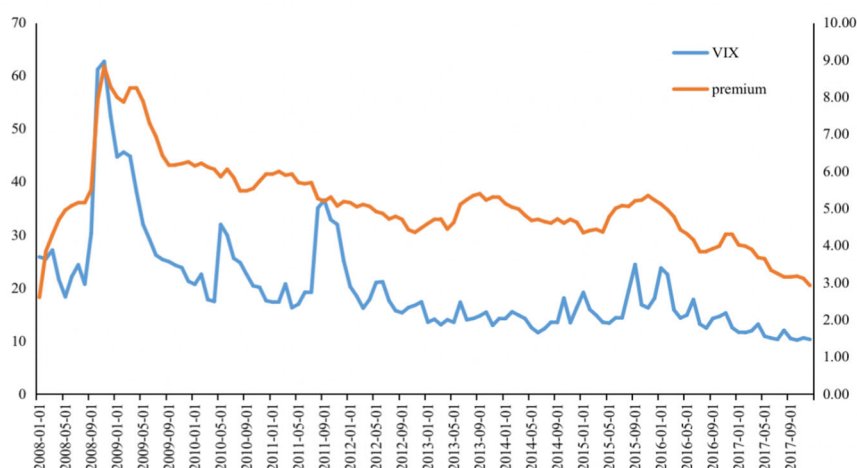


Fig. 2 Variation trend of variable

In order to further test the relationship between them, this paper establishes the ordinary least squares model. Ordinary Least Square estimation method (OLS for short) is the most common and basic estimation method for linear regression models with a single equation. The basic idea of OLS is to make the estimation of the model possible by minimizing the sum of squares of the residuals.

The specific model form is as follows:

$$premium_t = \alpha_0 + \alpha_1 \log VIX_t + \varepsilon_t \quad (1)$$

Among them, $\log VIX_t$ is the core explanatory variable of this paper, namely the VIX index of global risk aversion. $premium_t$ is the explained variable of this paper, namely the level of enterprise risk premium. α_0 is a constant term; α_1 is the key factor of this paper, which measures the change of one-unit VIX index can lead to the change of the risk premium of American enterprises. ε_t is a random error term.

4. Results

According to the above empirical model, this paper conducted regression on the OLS model, and the results were shown in Table 1:

Table 1. Regression results table

Variable	premium
Log VIX	2.3802 (0.2088)
constant	-1.9826 (0.6114)
p value	0.000
observations	132
R-squared	0.5000

According to Table 1, a one-percentage-point change in the VIX leads to an increase of 2.3802 percentage points in the US corporate risk premium. This shows that risks in financial markets can easily be transmitted to the real economy. This is also an important reason why the Great Depression of the 1930s and the financial crisis of 2008 led to the global economic downturn. First of all, credit default events push up financing costs, increase the principal and interest repayment pressure of credit subjects, and aggravate their own liquidity risk. Secondly, when a bond defaults, other bonds issued by the bond issuer will also have reduced liquidity or mature early, thus causing liquidity pressure and financing difficulties for the holders of these bonds, resulting in broader credit risks and liquidity risks. Finally, the credit default of a certain issuer is easy to trigger the change of market sentiment and evolve into an industrial and regional credit crisis. If banks stop lending to the industry or related regions, and financial market investors stop buying non-standard assets such as bonds and trusts of enterprises in the industry or related regions, it will cause an industry-specific and regional liquidity crisis. In 2018, a similar situation occurred in some local government financing vehicles and in Shandong and Shanghai [9].

In recent years, more and more financing entities, including a large number of private enterprises, state-owned enterprises and local government financing platform companies, are financing in domestic and foreign financial markets at the same time. In this case, the credit default risk in the domestic market will quickly spread to the overseas market, affecting the risk appetite and valuation of Chinese dollar bonds among international investors, and vice versa. If the RMB exchange rate fluctuates too sharply, it will further increase the complexity of internal and external risk transmission. After the "8.11 exchange rate reform" in 2015 to 2016, the RMB exchange rate depreciated significantly, resulting in greater capital outflow pressure. What is more serious is the interaction between exchange rate depreciation expectation and capital outflow pressure, resulting in a vicious circle. While exchange rate and capital account pressures are low for now in 2019, the current account pressure from falling exports cannot be ignored and will need to be closely watched. Once there are

signs of excessive depreciation of the RMB exchange rate and large capital outflow, decisive measures should be taken to avoid a repeat of the mistakes of 2015 and 2016.

5. Conclusion

According to the results of this study, risks in financial markets are highly likely to be transmitted to the real economy, and every one percentage point change in the VIX index can lead to an increase of 2.3802 percentage points in the risk premium of US enterprises. In order to prevent the occurrence of systemic financial risks, enterprises should prepare for a rainy day and actively respond to the change of global risk aversion. Therefore, this paper puts forward the following suggestions:

The government should strengthen the development of internal control systems in the financial sector. First of all, we need to implement the decision-making responsibility system. Financial sector decision-making personnel should be responsible for their own decisions, executive personnel should conscientiously implement the decisions, supervisors should not only to the executive personnel of the actual operation of supervision, but also to the decision-making personnel of supervision. Secondly, we should establish an organizational system in which powers and responsibilities are clearly defined and mutually restricted. According to the characteristics and requirements of the work, the reasonable establishment of posts, clear work tasks, give each post the corresponding responsibility and authority, establish mutual cooperation, mutual supervision, mutual restriction of the internal control system. Third, establish an early warning, forecasting and handling system for violations. Establish the supervisory system and report and audit system of the competent business departments, and give timely early warning and forecast to the emerging problems and possible risks. Fourth, establish a control, conversion and compensation system for violations. Control the development of problems that are still in their infancy. Measures should be taken to immediately correct violations that have occurred. If there are difficulties in correcting them, they will be accommodated by existing policies. Where losses have been caused, preservation measures shall be taken immediately and administrative and legal means shall be used to properly deal with them so as to reduce risks and losses. Fifth, establish the annual audit system of emerging business. New businesses should be regulated in accordance with the principle of advanced systems, businesses outside the scope of the system are strictly prohibited, businesses at the edge of the system are controlled, and businesses already in operation should be tracked and supervised to prevent them from getting out of control.

Establish and improve the early warning system of financial risk points. To prevent financial risks, we must start with the prevention of risks, establish and improve the financial point risk early warning system and related systems, and ensure the normal operation of the early warning system through institutional constraints. One is to list comprehensive and detailed risk elements and risk control points, which should consider both internal risks and risks caused by external factors; Consider both static and dynamic risks; We need to consider both operational risks and institutional and policy risks. The second is to identify and analyze risks, identify the internal risk mechanism is perfect; Whether the mechanism for identifying external risks is sound; The ability to identify the risks to each significant business activity objective; Estimate the probability, frequency, importance and possibility of risk; The harm caused by the risk. The third is to take risk control activities and measures. In view of the possible risks, the activities and measures to be taken should be listed. The control activities should be connected with the risk assessment process, appropriate and practical, and the implementation of management instructions should be guaranteed.

Deepen reform of the enterprise management system. We will accelerate the process of establishing a modern enterprise system and create a favorable external environment for financial institutions to prevent and defuse risks. Enterprises must transform themselves into share-holding companies, establish a modern enterprise system, expand their capital and stimulate their vitality. The enterprise reform will provide the financial industry with a rare opportunity to strengthen credit risk management and improve the quality of credit assets. Financial institutions should actively support

enterprise restructuring, participate in the process of enterprise restructuring, implement loan creditor's rights, fulfill loan guarantee responsibilities, and prevent enterprises from hanging, evading or abolishing debts. Transforming the government functions at an accelerated pace and reduce administrative intervention in financial micro-activities. The relationship between the government and financial institutions must be straightened out, it is imperative that the government behaves in a standard manner, and completely change the government's intervention in the issuance of financial credit by compulsory administrative means. Economic management by the government should conform to the objective requirements of the socialist market economy, utilize the market mechanism to its fullest extent and bring it into play. The financial industry can be guided by industrial, credit, and guiding plans, as well as by creating a favorable environment for independent lending by financial institutions by using industrial, credit and guiding plans.

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