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MACROECONOMIC DETERMINANTS OF CREDIT SPREADS: AN EMPIRICAL COMPARISON BETWEEN CHINESE AND AMERICAN CORPORATE BONDS

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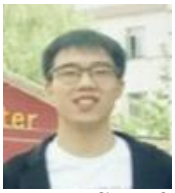

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ABSTRACT

This paper discusses the determinants of credit spreads in China and the United states. Based on the sampled data of corporate bonds in the two countries from 2011 to 2017, we fit the yield curve of the treasury bonds with the Nelson-Siegel Model and calculate the credit spreads of each corporate bond. Then we use multiple linear regression and vector auto regression model (VAR) to analyze the determinants. The results indicate that the model can explain a large part of the credit spreads and the goodness of fit reaches over 60%. The specific results are as follows: (1) GDP and stock market volatility are negatively correlated with the credit spreads of Chinese corporate bonds but positively correlated with that of American corporate bonds with high significant level; (2) M2, stock market indexes and risk-free yield rate are negatively correlated with the credit spreads of both countries despite the fact that of all these three determinants M2 is not significant in the U.S. market and the risk-free rate of return is not significant in the Chinese market; (3) the slope of treasury bond yield curve is positively correlated with the credit spreads of corporate bonds in both countries; and (4) the impulse response shows that the impact of the determinants on credit spreads is obviously weaker than the impact of credit spreads on the determinants, which indicates that credit spreads might have a certain degree of predictive function.

Contribution/ Originality: This study examines the determinants of credit spreads in China and the United states by using the data for corporate bonds in the two countries from 2011 to 2017.

1. INTRODUCTION

With the trend towards global financial integration, the financial markets around the world are increasingly connected. In this process, China's capital market plays a vital role. But as a developing country, it is still important for China to learn from the United States, which is the most developed market economy country. The development of the bond market, especially the corporate bond market, exerts a powerful influence over China's further improvement of the financial market structure, a combination of the various needs of corporate financing and adaptation of investors' risk-return preferences. The price of corporate bonds is affected by many factors such as credit risk. In order to characterize credit risk in bond market, credit spreads are commonly used. Therefore, as an

critical indicator in the bond market, the study of bonds is increasingly important in the context of financial integration.

2. LITERATURE REVIEW

Research on the determinants of credit spreads in China and other countries focused on several categories: macro determinants, micro determinants, macro-micro determinants and other determinants. Collin-Dufresn *et al.* (2001) first summarized the theoretical determinants of credit spread changes, such as the spot interest rate, the slope of Treasury bond yield curve, the corporate financial leverage and the business environment. In the subsequent studies many scholars continued to use their methods to study determinants affecting the credit spreads around the world. Manzoni (2002) and Luís *et al.* (2012) studied the determinants of the credit spreads of European bonds; Tsuji (2005) and Azad *et al.* (2018) studied the determinants of Japanese corporate bond credit spreads; Thuraisamy *et al.* (2008) studied the determinants for credit spreads which affect the international bond credit spreads in the sovereign states of Latin America; Lepone and Wong (2009) studied the most important determinants for the credit spreads in the Australian bond market; Loncarski and Szilagyi (2012) and Hollander and Liu (2016) studied the credit spreads of corporate bonds in the United States; Dai and Sun (2011); Sun (2010); Fan and Zhang (2009); Guo *et al.* (2016); Zhou and Niu (2017); Chen *et al.* (2015) studied the determinants affecting the credit spreads in the Chinese bond market; and Thakur *et al.* (2018) analyzed the macroeconomic determinants of credit spreads in the Indian corporate bond market.

In the existing studies, the research focuses on corporate bonds in developed countries such as the United States, Japan and Australia. As for the determinants affecting credit spreads, the macro level determinants include: the spot rate, the slope of the government bond yield curve, the stock market volatility, economic cycle etc; the micro level determinants include: taxation, liquidity, leverage ratio etc. Among them, increasing attention has been paid to the economic cycle and the leverage ratio.

Few researchers have compared the credit spreads between China and the US with comprehensive determinants. Different countries have different bond histories, government policies, economic systems, marketization levels and investor preferences. Therefore, the determinants between China and the United States are also very complicated. This paper attempts to compare and analyze the determinants of corporate bond credit spreads between the two countries and provide suggestions for the reform of Chinese bond market. This paper is one of very few studies which systematically compared the credit spreads in China and the US market with comprehensive determinants. It also clarifies the relationships between credit spreads and various variables and provides evidences for the predictive effect of credit spreads.

3. CREDIT SPREAD ACQUISITION METHOD: THE NELSON-SIEGEL MODEL

Scholars usually define the difference between the bond yield and the Treasury bond yield of the same maturity as the credit spread. However even in the mature bond market, it is difficult to obtain the treasury bonds which have exactly the same maturity and cash flow with the target bonds. In the matching process, if the corresponding Treasury bond does not match the corporate bond in the research, linear interpolation is generally used to calculate the credit spread. This method, however, leads to considerable and unmanageable error. Especially in emerging bond markets, such as the Chinese bond market, most corporate bonds cannot find matching treasury bonds. To study the determinants of credit spreads, we must firstly be able to measure credit spreads more accurately. Zhou and Niu (2017) suggested using the point-to-line or line-to-line methods to calculate credit spreads by fitting the yield curve. To calculate the credit spread, we use the Nelson-Siegel model for the Chinese Treasury bond yield, and in the model, the forward interest rate formula is:

$$f(t) = \beta_0 + \beta_1 e^{-t/\tau} + \beta_2 \frac{t}{\tau} e^{-t/\tau} \quad (1)$$

In Equation 1, t is the maturity and $f(t)$ is the forward interest rate when the maturity is t, τ is the parameter to be estimated which changes with time; β_0 is the long-term interest rate; β_1 is the slope of the term structure of interest rates; β_2 is the curvature for the term structure of interest rates.

The relation between spot interest rate $r(t)$ and the forward interest rate $f(t)$ is shown in Equation 2:

$$r(t)=\frac{1}{t}\int_0^t f(u)du \tag{2}$$

Then we can get the spot yield curve:

$$r(t)=\beta_0+\beta_1\left[\frac{1-e^{-t/\tau}}{t/\tau}\right]+\beta_2\left[\frac{1-e^{-t/\tau}}{t/\tau}-e^{-t/\tau}\right] \tag{3}$$

Different methods for credit spread calculation were chosen based on the different conditions of the two countries. Chinese corporate bonds have a relatively short history compared with bonds from the United States. As a result, the number of issued bonds with matching Treasury bonds is small. So we used the Nelson-Siegel Model to fit the term structure of the Treasury bond interest rate. We selected the closing price of the last trading day, the maturity, the annual interest rate, and the number of annual interest payments as our indexes. Through the genetic algorithm, we fitted the Treasury bond interest rate curve for each month of the last trading day. Through the afore-mentioned process, we got 75 current interest rate curves of Treasury bonds. The credit spread of the corporate bond was obtained by subtracting the yield to maturity of the same remaining maturity Treasury bond from the yield to maturity of the corporate bond. For the subsequent multivariate regression analysis, credit spreads of each month were averaged. Since the number of corporate bonds issued in the United States is large and the matching Treasury bonds are easy to find, the credit spreads were calculated directly by the differences between the yield to maturity of the corporate bonds and the yield to maturity of the matching treasury bonds.

4. TRANSMISSION MECHANISM FROM MACROECONOMIC DETERMINANTS TO CORPORATE BOND CREDIT SPREADS

4.1. Gross Domestic Product (GDP)

GDP can be used to measure a country's economic situation. Its impact on corporate bond credit spreads can be realized in two different ways. On the one hand, the continuously growing GDP shows that the current economic situation is improving, conveying effective information to the market and investors. Investors will expect that the economy is developing steadily and their willingness for investing in bonds will increase. Correspondingly the demand for bonds will also increase, causing the rise of security price, the decrease of yield to maturity and the narrowing of corporate bond credit spreads. On the other hand, if GDP continues to grow and inflation expectations increase, the People's Bank of China will raise interest rates accordingly. Thus the risk of debt will increase and investors will require higher risk compensation, which will cause the credit spreads to widen. In addition, stocks and bonds are the main channels for financing in the capital market. When the economic situation continues to improve, there will be a large amount of funds invested in the stock market, which may reduce the funds used for bond investment in the market. As a result, the price of bonds will fall and the credit spreads will be broader.

4.2. Money Supply

In general, we use the money supply M2 to represent the amount of money a country provides for the normal operation of the economy at a certain point in time. When M2 increases, it indicates the loose monetary conditions in the current market and the steady development of the economic situation. At this time, the default probability of a company is low, so the corporate bond credit risk is reduced and the compensation given to investors is reduced.

The empirical results of the predecessors show that there is a negative correlation between M2 and bond credit spreads.

4.3. Stock Market Indexes

The stock market indexes are important indicators to measure the market situation of the capital market. As an important variable of the macro economy, it affects the expectations of investors on the market and the trend of the future economy. The impact of the stock market indexes on bond credit spreads can also be explained in two ways. On the one hand, the rise of stock market indexes reflects the increase of the company's shareholder equity value and the improvement of the company's capital structure. Under such circumstance, the default risk will decrease, investors will have positive expectations for the company and its bond credit spread will be narrowed. On the other hand, the stock market has a certain degree of substitution effect on the bond market. If the stock market indexes continue to rise, which shows that investors' stock returns will increase, investors' investment in the stock market will increase further. As a consequence, investors will reduce their investment in the bond market. The insufficient demand will lead to the fall of the bond prices, the rise of the bond yield and the widening of credit spreads.

4.4. Stock Market Volatility

Stock market volatility is an important indicator of stock market risk and also represents the volatility of corporate value. On the one hand, a company's option value will increase with its stock market volatility. According to the structural model, the bond credit spreads will increase as the stock market volatility increases. On the other hand, the stock market volatility indicates the risks in the stock market, which will largely affect investors' investment choices. With the increase of the volatility, the funds will gradually flow into the bond market, because the bonds will repay the capital with interests regularly and make this part of the funds safer. As a result, the credit spreads will narrow.

4.5. Risk-Free Interest Rate

Risk-free interest rate refers to the rate of return on investing in projects with no or little risk. It is an important indicator for measuring macroeconomics and is generally substituted by Treasury bond yields. Previous studies have shown that there is a significant connection between risk-free interest rates and bond credit spreads. The rise in risk-free interest rates indicates that the economic situation is improving, the risk of the company is becoming smaller and the possibility of default is reduced, which might lead to a reduction in credit spreads.

4.6. Slope of Treasury Bonds Yield Curve

The slope of Treasury bonds has a predictive effect on the macro economy. As the slope increases, the curve of yield curve of Treasury bonds becomes steep, which indicates that the economic outlook is improving and the credit spreads are narrowing. Conversely, when the slope of the Treasury bond is reduced, the yield curve of Treasury bond becomes smoothing, which indicates that the economy has is going downwards and the credit spreads are increasing.

5. EMPIRICAL STUDY ON THE DETERMINANTS OF THE CREDIT SPREADS OF CHINESE AND AMERICAN CORPORATE BONDS

In terms of variable selection, this paper makes some appropriate supplements on previous studies and selects six variables. Among them, GDP is a measurement of the economic growth of China and the United States; money supply is a measurement of the money market environment; stock market index and stock market volatility are variables that measure stock market risk returns; and the risk-free interest rate and slope of Treasure bonds are variables that measure macroeconomic trends.

Table-1. Variable selection and meaning.

Variable Name	Variable Meaning	Data Processing Method
GDP	Gross domestic product	Take the quarterly GDP data of China and the United States, convert it into monthly data
M2	Money supply	Take the monthly growth rate of M2 in China and the United States
CSI300/SPX500	Stock market index	Take the logarithm of the closing price data of the last trading day of the Shanghai and Shenzhen 300 Index and the S&P 500 Index
VIX	Stock market volatility	Take the monthly volatility of China's CSI 300 Index and the U.S.'s S&P 500 Index
RF	Risk free interest rate	Take the monthly yield of the 10-year treasury bond between China and the United States on the last trading day of the month
SLOPE	The slope of Treasury bond yield curve	Take the yield of 10-year Treasury bond minus the yield of the 1-year Treasury bond on the last trading day of the month in China and the United States

Source: Summarized by the author.

Considering the short history of the Chinese corporate bond market, the time range for this paper is from January 2011 to March 2017 in order to make a better comparison with the American corporate bonds. The data in all variable sequence is monthly data. We obtained the data from the Wind database and the Bloomberg database. In order to maintain the consistency in variables' order of magnitude, the gross domestic product and the stock market index were processed logarithmically. The variable selection and processing methods are shown in Table 1 above. Table 2 gives a statistical description of the credit spreads of corporate bonds and their determinants between China and the United States.

Table-2. Descriptive statistics of the credit spreads.

Variable	Mean	Median	Maximum	Minimum value	Standard
CS_CN	2.0116	1.9695	3.4674	1.2964	0.4192
CS_US	1.2514	1.2402	1.5726	1.0295	0.1280
GDP_CN	11.9338	11.9400	12.2600	11.5600	0.1672
GDP_US	9.7456	9.7421	9.8552	9.6312	0.0674
M2_CN	13.3106	13.3000	17.2000	10.1000	1.5343
M2_US	6.9244	6.5500	10.3600	4.4700	1.4488
CSI300	7.9495	7.8992	8.4848	7.6684	0.2025
SPX500	7.4535	7.5280	7.7679	7.0312	0.2043
VIX_CN	25.0932	24.6600	41.6300	11.0000	7.8139
VIX_US	11.8529	10.6300	18.5900	6.0800	3.5184
RF_CN	3.56144	3.5340	4.5518	2.7258	0.4735
RF_US	2.2250	2.1700	3.4700	1.4600	0.4937
SLOPE_CN	0.6605	0.6406	1.8598	0.0313	0.3175
SLOPE_US	1.9388	1.8100	3.1700	0.9600	0.5747

Source: Obtained from Wind database and Bloomberg database.

In general, the credit spreads of Chinese corporate bonds are wider than the credit spreads of U.S. corporate bonds. While screening the corporate bonds of the two countries, we found that the rating was generally above the AA level. The studies have shown that the rating of Chinese corporate bonds is overvalued, while the rating of the U.S. corporate bonds is more market-based. The smaller the risk of default on high-rated bonds is, the less premium needs to be paid. Therefore, the credit spreads of U.S. corporate bonds with corresponding ratings will be lower. The difference between the maximum and minimum credit spreads of Chinese corporate bonds was greater than that of the U.S. corporate bonds, which might also be related to the ratings. The difference in the Chinese market was large, indicating that with the continuous development of corporate bonds in China, the rate of return reflected the different situations of different market players. The difference between the U.S. market was small, mainly

because the U.S. corporate bonds selected are mostly above the AA level, and the bonds on the AA level or higher are less risky. Thus, the yield was low and the range between the maximum and minimum values was small.

5.1. Multiple Linear Regression Model

We define corporate bond credit spread (CS) as a dependent variable and each macroeconomic factor as an independent variable to establish the regression model.

$$CS\_CN_t = \alpha_0 + \alpha_1 GDP\_CN_t + \alpha_2 M2\_CN_t + \alpha_3 CSI_t + \alpha_4 VIX\_CN_t + \alpha_5 RF\_CN_t + \alpha_6 SLOPE\_CN_t + \mu_t$$

$$CS\_US_t = \beta_0 + \beta_1 GDP\_US_t + \beta_2 M2\_US_t + \beta_3 SPX_t + \beta_4 VIX\_US_t + \beta_5 RF\_US_t + \beta_6 SLOPE\_US_t + \nu_t$$

Table 3 gives the regression results.

Table-3. Regression results between China and the United States.

Variable	CS_CN	CS_US
GDP	-0.833***	6.868***
	(-2.893)	(7.175)
M2	-0.084***	-0.011
	(-2.637)	(-1.131)
CSI300/SPX500	-1.455***	-1.965***
	(-7.112)	(-6.957)
VIX	-0.010	0.007*
	(-1.873)*	(1.881)
RF	-0.127	-0.224***
	(-1.459)	(-3.440)
SLOPE	0.314***	0.231***
	(2.979)	(3.052)
Adj-R^2	0.632	0.690

Note:* indicates significance at the 10% level, ** indicates significance at the 5% level, *** indicates significance at the 1% level; the t statistic is in parentheses. The same as below.

The regression results showed a similar goodness of fit between China and the United States, both above 60%, and the fitting effect was pretty good, indicating that the credit spreads of corporate bonds in the two countries have a considerate correlation with macroeconomic determinants. The regression fit of the U.S. market was slightly stronger than that of the Chinese market.

Among all the determinants, China's GDP was negatively correlated with its corporate bond credit spreads, but America's GDP was positively correlated with its corporate bond credit spreads with a high level of significance. In the Chinese market, the increase in GDP indicates a promising future and raises investors' expectations. The increase in investors' demand for bonds will lead to the rise in their prices and the fall of yields. In the US market, the economic situation is improving and the stock market is booming. As a result of the substitution effect, investors' funds will flow more into the stock market which will affect the bond market.

China M2 and America's M2 were both negatively correlated with their corporate bond credit spreads, but the negative correlation was not significant in the U.S. market. When M2 increases, the money market environment will be better, and the company's default risk is also reduced accordingly. So, it had a negative correlation with corporate bond credit spreads.

China's CSI300 and America's SPX500 were negatively correlated with their corporate bond credit spreads, both of which have high levels of significance. The increase of the stock market indexes will improve the value of the company. When the value of the company's equity increases, the value of the creditor's right will decrease accordingly, which can optimize the capital structure of the company, reduce its default risk and narrow the credit spread. The Chinese stock market VIX was negatively correlated with its corporate bond credit spreads, and the U.S. stock market VIX was positively correlated with its corporate bond credit spreads. Volatility is a measurement

of risk. If it increases, option value will increase accordingly. According to the structured model, credit spreads will also increase. However, in the Chinese market, if the volatility increases, investors will believe that the stock market is more risky. The stronger the motivation to avoid risks, the more funds will flow into the relatively safer bond market. Therefore, the demand in the bond market will increase and the credit spreads will be narrowed. China's and America's RF were negatively correlated with their corporate bond credit spreads, but the negative correlation was not significant in the Chinese market. China's and America's SLOPE of Treasury bond were positively correlated with corporate bond credit spreads, which was inconsistent with previous studies.

5.2. The Construction of the VAR Model

Before the model construction, we used the ADF (Augmented Dickey-Fuller) unit root to test the stability of data time series. The test results showed that the sequences CS, GDP, M2, CSI300, SPX500, VIX, RF and SLOPE of China and the United States were non-stationary sequences, and their first-order difference sequences were stationary sequences. The first-order lag order was selected under the SC criterion. At this time, as shown in Figure 1 and Figure 2, the absolute values of the AR roots of both China and the United States fell within the unit circle, indicating that the model had high stability and credibility. Table 4 and Table 5 give the vector auto regression results.

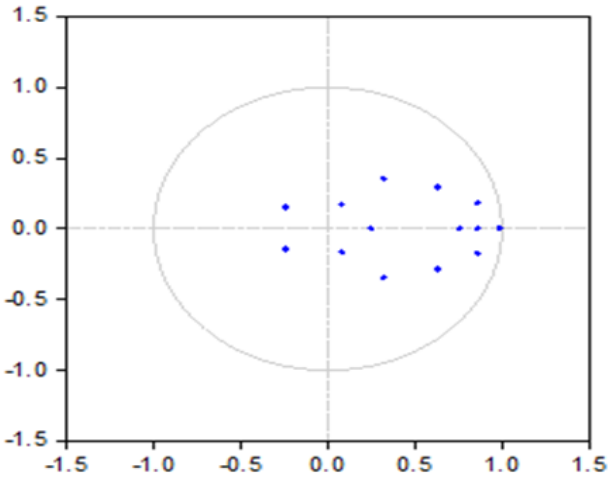

Figure-1. Inverse roots of AR characteristic polynomial of China.
Source: Results have been obtained by the author in EVIEWS software.

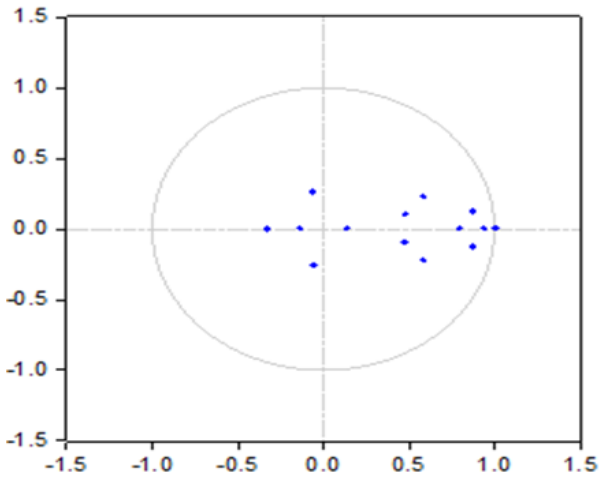

Figure-2. Inverse roots of AR characteristic polynomial of U.S.
Source: Results have been obtained by the author in EVIEWS software.

Table-4. VAR results of China.

Variable	CS	GDP	M2	CSI300	VIX	RF	SLOPE
CS(-1)	0.590***	-0.019	0.196	-0.024	2.378*	0.061	0.065
	(6.037)	(-1.048)	(0.575)	(-0.726)	(1.648)	(0.960)	(0.640)
GDP(-1)	-0.373	0.902***	-1.172	-0.032	5.035	0.144	-0.436*
	(-1.529)	(19.593)	(-1.381)	(-0.386)	(1.399)	(0.908)	(-1.719)
M2(-1)	-0.028	-0.007	0.685***	-0.011	0.692*	0.027	-0.062**
	(-1.047)	(-1.404)	-7.368	(-1.209)	(1.753)	(1.528)	(-2.215)
CSI300(-1)	-0.479**	-0.050	-0.981	0.899***	5.755*	0.043	0.245
	(-2.218)	(-1.215)	(-1.304)	(12.295)	(1.805)	(0.308)	(1.090)
VIX(-1)	-0.005	0.001	0.028*	-0.001	0.871***	0.003	0.007
	(-1.088)	-0.684	(1.700)	(-0.418)	(12.349)	(-0.008)	(1.359)
RF(-1)	-0.003	-0.006	0.035	-0.013	-0.598	0.936***	0.118
	(-0.041)	(-0.440)	(0.143)	(-0.551)	(-0.570)	(20.236)	(1.601)
SLOPE(-1)	0.076	0.009	0.699**	-0.06**	1.992	-0.092	0.604***
	(0.844)	(0.548)	(2.243)	(-1.968)	(1.507)	(-1.569)	(6.484)
Adj-R^2	0.743	0.941	0.750	0.876	0.842	0.915	0.521

Source: Results have been obtained by the author in EVIEWS software.

Table-5. VAR results of the United States.

Variable	CS	GDP	M2	SPX500	VIX	RF	SLOPE
CS(-1)	0.851***	0.002	0.093	-0.074	4.042**	0.086	0.111
	(7.488)	(0.021)	(0.111)	(-1.450)	(2.395)	(0.260)	(0.378)
GDP(-1)	-0.515	0.973***	-0.466	1.623***	24.897	-3.038	-3.957
	(-0.45)	(4.063)	(-0.052)	(3.007)	(1.385)	(-0.869)	(-1.267)
M2(-1)	0.010	0.001***	0.858***	-0.006	0.145	-0.029	-0.031
	(1.119)	(4.093)	(13.194)	(-1.465)	(1.103)	(-1.143)	(-1.340)
SPX500 (-1)	0.205	0.012*	-1.166	0.495***	-6.724	0.549	0.676
	(0.588)	(1.780)	(-0.454)	(3.183)	(-1.297)	(0.544)	(0.750)
VIX(-1)	0.002	0.001	-0.016	-0.001	0.894***	-0.020*	-0.022**
	(0.461)	(0.357)	(-0.595)	(-0.453)	(16.330)	(-1.848)	(-2.333)
RF(-1)	0.035	0.003	0.609	-0.062*	-0.841	0.995	0.074
	(0.462)	(-0.103)	(1.104)	(-1.866)	(-0.755)	(4.596)	(0.384)
SLOPE(-1)	-0.025	0.001	-0.570	0.071*	2.285*	-0.243	0.672***
	(-0.290)	(0.548)	(-0.912)	(1.880)	(1.812)	(-0.991)	(3.069)
Adj-R^2	0.697	0.884	0.872	0.977	0.910	0.822	0.897

Source: Results have been obtained by the author in EVIEWS software.

As shown in Table 4 and Table 5, compared with the results of the above multiple regression analysis, the goodness of fit of VAR model in China has been improved to some extent. The modified goodness of fit was as low as 52.1% and as high as 94.1%.The goodness of fit of the VAR model of the United States was generally higher than that of the Chinese market, with the highest and the lowest reaching 99.7% and 69.7% respectively.

Figure 3 and Figure 6 showt the impulse response of corporate credit spreads between China and the United States separately.

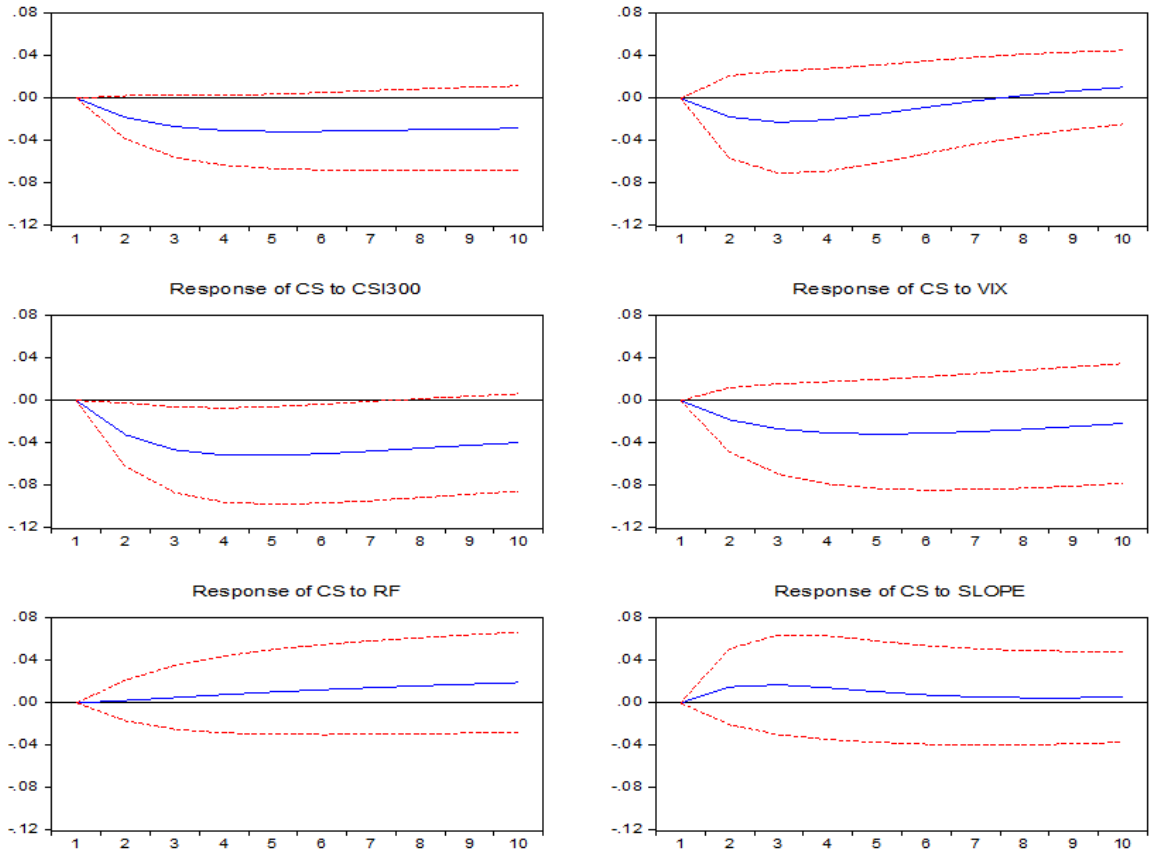

Figure-3. Response of Chinese corporate bond credit spreads to various variables.

Source: Results have been obtained by the author in EVIEWS software.

As shown in Figure 3, one standard deviation of the positive impact of China's GDP began to have a negative influence on the credit spread of China's corporate bonds from the second phase, and it was most obvious in the fifth

phase, in which it became a relatively stable trend. This was because GDP had little effect on the corporate bond market at first, but there is a significant negative effect in the subsequent phases. One standard deviation of the impact of the money supply negatively influences the credit spreads of corporate bonds at the beginning, but the negative influence gradually decreases to become positive in and after the seventh phase. The reason is that with the increase of money supply, the government begins to implement the loose monetary policy. Thus, the investors may have a positive expectation on the future economy and anticipate that the default rate would be lower, which results in the narrow corporate bond credit spreads.

An increase of the money supply, however, would lead to inflation. To make up for the loss of inflation, the investors will require a higher return on and increase corporate bond credit spreads. The positive impact of CSI300 index and volatility index have a negative influence on corporate bond credit spreads, and the impact of CSI300 index on corporate bonds is relatively stronger. One standard deviation of positive impact of China's risk-free interest rate positively influences the credit spread of Chinese corporate bonds, and the influence shows a trend of strengthening. One standard deviation of positive impact of the interest rate difference of Chinese government bonds also positively influences the credit spread of Chinese corporate bonds, and the influence gradually weakens after reaching the maximum in the third phase.

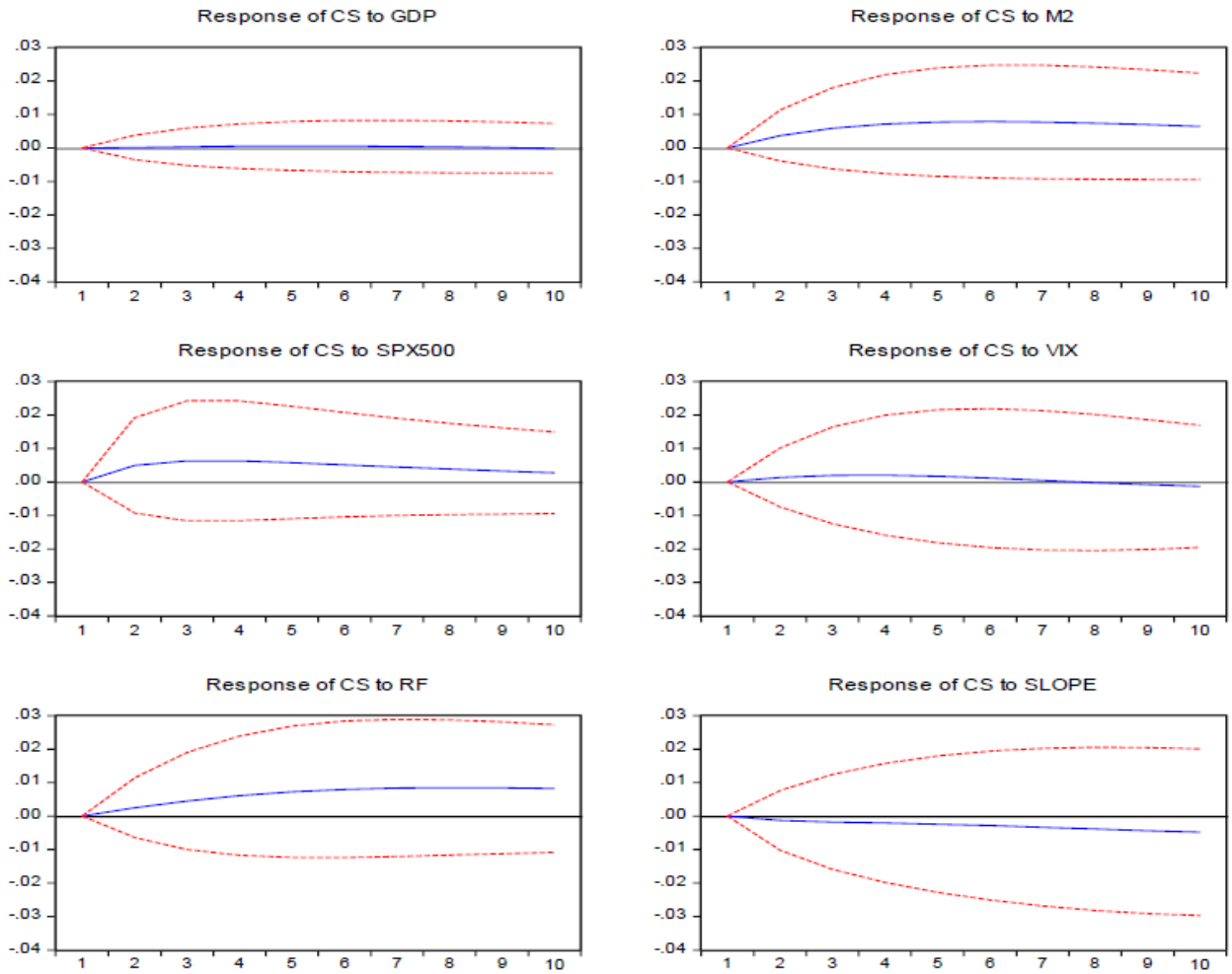

Figure-4. Response of U.S. corporate bond credit spreads to various variables.

Source: Results have been obtained by the author in EVIEWS software.

As shown in Figure 4, one standard deviation of the positive impact of various determinants also influenced the changes of U.S. corporate bond credit spreads, but the influence was weaker than that of China. The reason might be that the U.S. is in a high degree of marketization level, and the development of corporate bond market will

interact with macroeconomic conditions. Consequently, the price and the yield to maturity of corporate bonds will be reflected in the money market and capital market. China's corporate bond market is still developing, so the prices will be affected by the after-effect of macroeconomic fluctuations. The impact of the U.S. GDP, stock market volatility and Treasury yields on its corporate bond credit spreads is nearly 0. One standard deviation of changes in the U.S. money supply and SPX500 will have a positive impact on the credit spreads of the corporate bonds, and it tends to weaken after reaching the seventh lag phases. The impact of one standard deviation of the changes in risk-free interest rate on corporate bond credit spreads tends to increase with the lag phase.

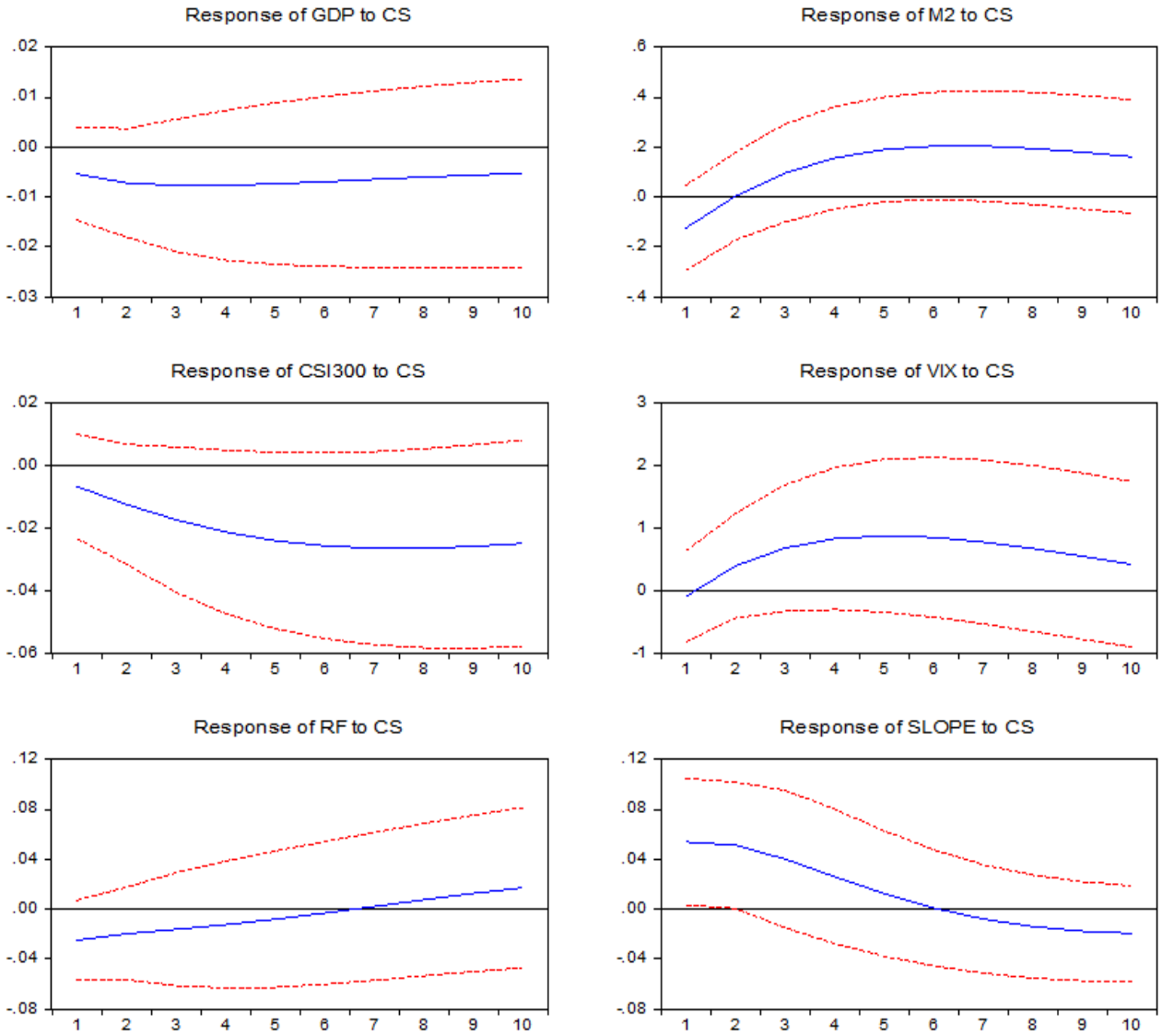

Figure-5. Response of Chinese variables to corporate bond credit spreads.

Source: Results have been obtained by the author in EVIEWS software.

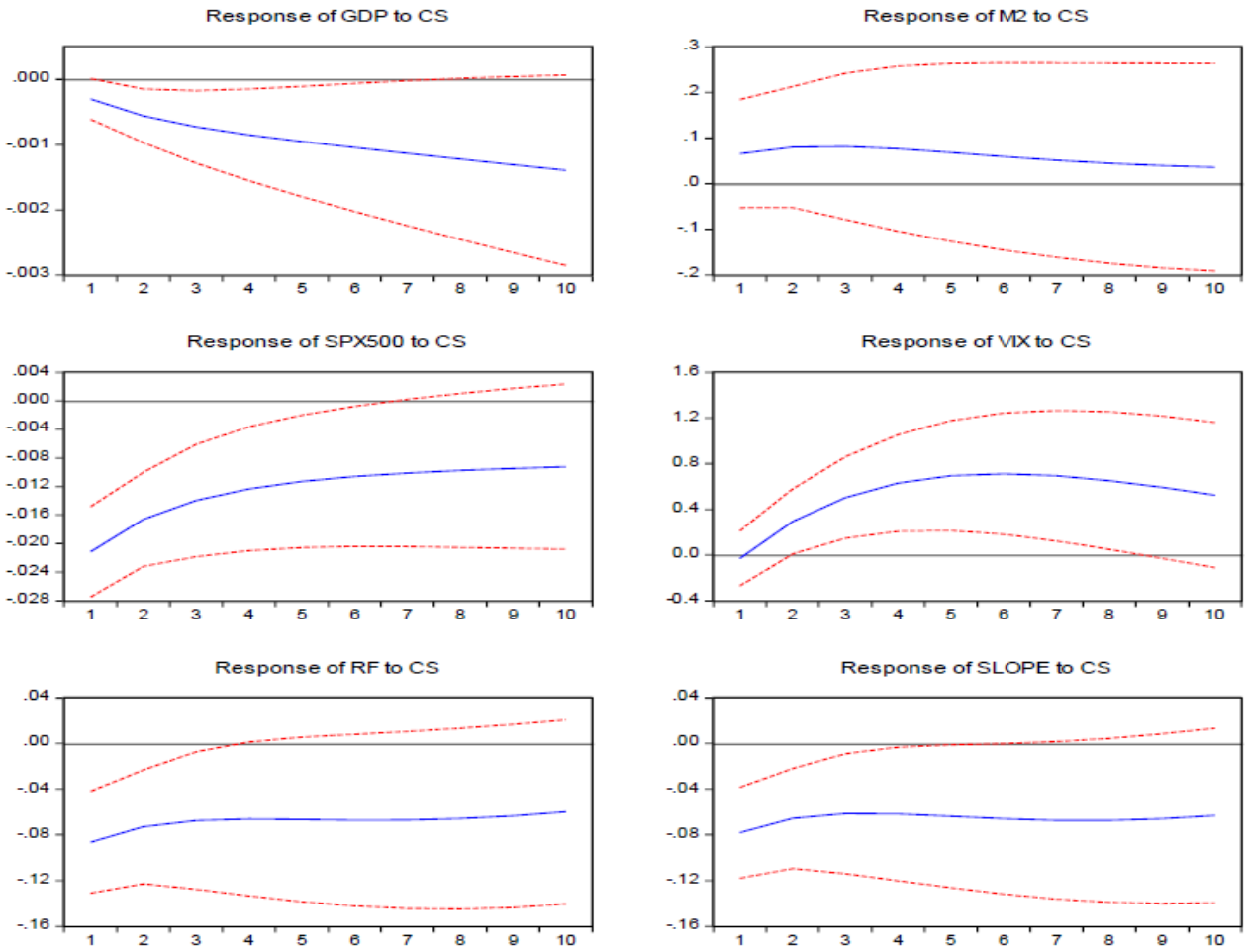

Figure-6. Response of U.S. variables to corporate bond credit spreads.

Source: Results have been obtained by the author in EVIEWS software.

Figure 5 and Figure 6 show the influence of one standard deviation of the impact of the credit spreads on the determinants between the two countries. We found that corporate debt credit spreads have a certain degree of predictive effect on the macro economy, because the impact response of credit spreads to various determinants is significantly stronger than the impact response of the determinants to the credit spreads. In terms of the impact of credit spreads, China's GDP shows a reverse stable process, while the U.S. GDP was merely influenced at the beginning but the consequence becomes increasingly obvious in subsequent phases. China's money supply was negatively impacted in the first lag phase, but after the second lag phases, the impact becomes positive and grows larger. The money supply of the United States was positively impacted and the impact gradually weakens afterwards. The impact response of credit spreads to CSI300 index was negative, and it gradually strengthened with the lag phase, which was contrary to the impact of credit spreads on the S&P500 index in the United States. The impact of credit spreads on the S&P500 index was relatively large at the beginning, and it gradually weakened afterwards. The impacts of credit spreads on the stock market volatility between China and the United States were similar. In both cases, credit spreads had the largest impact during the fifth to sixth lag phases. However, the impact on the stock market volatility in the United States was greater, indicating that the linkage effect between the stock market and the bond market in the United States is more obvious. The impact of credit spreads on the risk-free interest rate in Chinese market changed from negative to positive in the seventh lag phase, while the impact of credit spreads on the risk-free interest rate in the U.S. market was always negative but greater. The impact of credit spreads on the slope of Chinese Treasury bonds yield curve turned from positive to negative in the seventh lag phase, while the impact of credit spreads on the slope of the U.S. Treasury bonds yield curve is also negative but greater.

6. CONCLUSIONS

Since their issuance, the overall scale and liquidity of Chinese corporate bonds have increased significantly. Corporate bonds are now playing an increasingly important role in the Chinese market. Because the gap still exists between China and the United States, embodied in the scale structure and the degree of marketization, the direction and significance of determinants are different. Therefore, this paper mainly focuses on the comparison between China and the United States on the determinants affecting the credit spreads of corporate bonds. The analyzed determinants include the gross domestic product, the money supply, the stock market index, the stock market return rate, the risk-free interest rate, and the interest rate difference between Treasury bonds of different maturity. The main conclusions of the study are as follows: the credit spreads of Chinese corporate bonds are wider than the credit spreads of the U.S. corporate bonds of the same rating; the macroeconomic determinants have strong explanatory power of the corporate bond credit spreads between the two countries, with the goodness of fit reaching above 60%; and the impact of corporate bond credit spreads on various variables is significantly weaker than the impact of various variables on corporate bond credit spreads, indicating that corporate bond credit spreads have a certain degree of predictive effect on macroeconomics.

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