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Research on the Factors Affecting Banker's Acceptance Exchange Yield in China

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Abstract: *By analyzing the effect of macroeconomic fundamentals, bill supply and demand, funding, and external events on banker's acceptance exchange yield by selecting the industrial producer price index (PPI) and consumer price index (CPI), which reflect macroeconomic aspects; the Negotiable Certificate of Deposit (NCD), Shanghai interbank offered rate (Shibor), which measure the short-to-medium-term funding costs, as indicators, and discounted volume (DV) and new loan amount (DLA), which reflect the supply and demand in the bill market, are used as indicators. Selected 43 different sets of monthly sample data combinations from December 2018 to June 2022 to construct a model for the banker's acceptance exchange yield and carry out model modification and analysis of the empirical results. The results show that, with other explanatory variables being held constant, the Shanghai Interbank Offered Rate (Shibor) and the new loan amount (NLA), which reflect the short-to-medium-term fund market, are positively correlated with banker's acceptance exchange yield. On the other hand, the industrial producer price index (PPI), the consumer price index (CPI), and the discounted volume (DV), which reflect the macroeconomic and bill supply and demand factors, are negatively correlated with banker's acceptance exchange yield. Furthermore, the banker's acceptance exchange yield is most affected by the short-to-medium-term funding costs.*

Keywords: *Banker's acceptance exchange yield, Bank's acceptance bill, Bill market, Influencing factors, Multiple linear regression*

1. Introduction

During the development of China's bill market, the pricing mechanism of the bill market has been developing naturally in the past without forming a unified market price due to reasons such as market fragmentation in different geographic areas and venues between different financial institutions and information asymmetry, which prevented market participants from fully grasping effective market information, as well as the lack of external regulatory measures[1]. In 2016, the Shanghai Commercial Paper Exchange was established, which built a unified bill trading platform across the country, ensuring the marketability and fairness of bill market transaction prices. Based on sufficient trading data and clear credit subjects on the Shanghai Commercial Paper Exchange, interference factors such as intra-bank transactions were eliminated. In 2018, the Shanghai Commercial Paper Exchange released the first banker's acceptance exchange yield curve, effectively filling the blank in the pricing and valuation field of the note market, making the market price more transparent, and providing guidance for financial institutions. For the bill market, the construction of the banker's acceptance exchange yield curve promotes the development of the note market's fair pricing ability. It also provides a data basis and research possibilities for this study[2].

Currently, most of the research on banker's acceptance exchange yield in China is mainly focused on the application level, such as fair value estimation of bill discounting, pricing reference for bill discount rates, and comparison of monetary market products as pricing reference benchmarks[3]. However, research on the influencing factors of the banker's acceptance exchange yield is still in the exploratory analysis stage. This study conducts quantitative research on the influencing factors of the national bank bill discount rate, analyzing the specific principles and effects of macroeconomic fundamentals, bill supply and demand, fund conditions, and external events on the discount interest rate, and identifying the main influencing factors that significantly affect the banker's acceptance exchange yield.

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The theoretical research on the influencing factors of the banker's acceptance exchange yield helps improve the functionality of the bill market, supplementing the academic research content and theoretical framework related to the bill market, and providing a reference for future research by other scholars. This study aims to deepen the understanding of the pricing mechanism of the bill market and improve the pricing mechanism of the bill market.

From a practical perspective, studying the role of the factors that affect the banker's acceptance exchange yield in economic forecasting, market risk supervision, and derivative pricing by analyzing the trends of the main influencing factors. Predicting the future trend of banker's acceptance exchange yield can help the main participants in the bill market to adjust their holdings and maturity structure promptly based on the prediction results, thereby obtaining excess returns in the bill market. For banking and financial institutions, using the predicted value as a fair measurement standard to calculate risk value can help manage risks in the bill market and adjust bills policy effectively. For corporate financing needs, it can help estimate financing costs and enable better control of financing costs.

2. Theoretical Analysis of the Factors Influencing the Banker's Acceptance Exchange Yield

Factor Selection for Theoretical Analysis: Referring to the research framework of the reference rate bond model, the quantitative model from four aspects: macroeconomic fundamentals, bill supply and demand, funds aspect, and external events.

2.1. Analysis of Macroeconomic Fundamentals

Macroeconomic conditions directly affect the supply and demand of bills, and indirectly affect the discount interest rate of bills by influencing the credit loan demand of enterprises and the loan volume of banks[4]. This article selects the consumer price index (CPI) and the producer price index(PPI) as reference indicators for macroeconomic fundamentals.

2.2. Analysis of Bill Supply and Demand

The supply of bills is divided into stock supply and incremental supply. The stock supply refers to the bills held by enterprises, while the incremental supply refers to the newly accepted bills. The demand for bills is divided into asset allocation demand and discount loan investment demand. The asset allocation demand refers to the demand of investors to allocate related assets such as bonds and bills, while the discount loan investment demand refers to the demand of banks to issue loans through bill discounting. The discounted volume can directly reflect the supply of bills in the bill market, while the loan increment can directly reflect the bill allocation demand of the main participants in the bill market. Therefore, this article selects the discounted volume (DV) and the increment of the new loan amount (NLA) as indicators to measure the influencing factors.

2.3. Analysis of Funding Conditions

Monetary policy and macro-prudential policies can control the supply and demand of funds in the bill market by controlling banks' funding costs and loan scale, thereby affecting the short-term interest rates of the bill market. With the establishment of the Shanghai Commercial Paper Exchange and the continuous regulation of bill market-related laws, the credit attributes of bills have gradually weakened, and their funding attributes have become more apparent. Bills are gradually becoming standardized assets. Short to medium-term funding costs have a significant impact on bill yields[5]. Therefore, this paper selects the Shanghai Interbank Offered Rate (Shibor) and Negotiable Certificate of Deposit (NCD) as the reference indicators for funding costs.

2.4. External events analysis

External events factors mainly manifest in the impact of peripheral political events on market expectations for macroeconomic prospects, thereby affecting the long-term yields of the bill market. In addition, the influence of foreign monetary policies leads to changes in foreign exchange reserves and capital outflows, which will have a certain impact on the short-term yields of the bill market. Finally, changes in domestic regulatory systems and decisions made in important political and economic conferences will affect the short-term volatility of bill market yields.

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3. Model Construction and Analysis of Empirical Results

3.1. Indicator Selection and Model Construction

Based on the theoretical analysis framework above, considering the data caliber and periodicity issues, we selected six indicators from four dimensions, including macroeconomic fundamentals, bill supply and demand, funding conditions, and external factors. These indicators are the Producer Price Index (PPI), Consumer Price Index (CPI), Negotiable Certificate of Deposit (NCD), Shanghai Interbank Offered Rate (Shibor), Discounted Volume (DV), and New Loan Amount (NLA). The unquantifiable external factors are represented by the random disturbance term μ. The data for this study was obtained from the Wind database. To ensure the consistency of data caliber and periodicity of the indicators, we initially set up the model for the banker's acceptance exchange yield as follows:

$$Y=C+\beta 1PPI+\beta 2CPI+\beta 3NCD+\beta 4Shibor+\beta 5DV+\beta 6NLA+\mu \quad (1)$$

Y represents the banker's acceptance exchange yield, βi (i=1,2,3,4,5,6) represents the model parameters, and μ represents the random disturbance term for external event factors.

3.2. Model Testing and Estimation

We selected 43 sets of monthly observation data from December 2018 to June 2022. For NCD, we selected the 6-month negotiable certificate of deposit value, and for Shibor, we selected the 1-month period Shibor value. Since the values of DV and NLA were relatively large, we took the logarithm to improve the fitness of the model. By importing the data into the model (1) and using the least squares method, we obtained the multiple linear regression equation by Eviews:

$$Y=4.00-0.04PPI-0.08CPI+0.0036NCD+0.86Shibor-0.45DV+0.12NLA+\mu \quad (2)$$

Among them, Y represents the banker's acceptance exchange yield, μ represents the random disturbance item of the external influence factor, NCD represents the negotiable certificate of deposit interest rate in 6 months, and Shibor represents the 1-month Shanghai interbank offered rate.

The regression results obtained through econometric software Eviews show that the t-statistics for NCD, DV, and NLA in the multivariate linear regression equation have corresponding p-values>0.05, but the model has a large R^2 coefficient of determination, and the F-test value is also significant. Some individual parameters did not pass the significance test, indicating the presence of severe multicollinearity in the model.

Further examination using the variance inflation factor (VIF) revealed that the VIF values for both the negotiable certificate of deposit (NCD) and the Shanghai interbank offered rate (Shibor) were greater than 10, indicating the presence of multicollinearity in the model. An attempt was made to correct the model by deleting the 6-month negotiable certificate of deposit (NCD) and retaining the explanatory variables that had a greater impact on the dependent variable.

Subsequently, the White test was used to examine the potential heteroskedasticity problem in the model. The results obtained through Eviews software are as follows:

Table 1: White test results

Heteroskedasticity Test: White			
F-statistic	2.556380	Prob.F(20,22)	0.0175
Obs*R-squared	30.06371	Prob.Chi-Square(20)	0.0688
Scaled explained SS	15.40475	Prob.Chi-Square(20)	0.7528

According to the test results of Table 1, at the 95% confidence level, nR^2=30.06371, which corresponds to a probability of 0.0688>0.05, thus the null hypothesis is accepted and there is no heteroscedasticity in the model.

Finally, using the partial autocorrelation coefficient to examine the autocorrelation problem in the model. The Eviews operation result is shown in Figure 1, where the first-period PAC is greater than 0.5, indicating the existence of autocorrelation.

Heteroscedasticity autocorrelation robust standard error (HAC) correction was applied, and the corrected multiple linear regression equation for the banker's acceptance exchange yield was obtained by Eviews software as follows.

$$Y=4.0-0.04PPI-0.08CPI+0.86Shibor-0.45DV+0.12NLA \quad (3)$$

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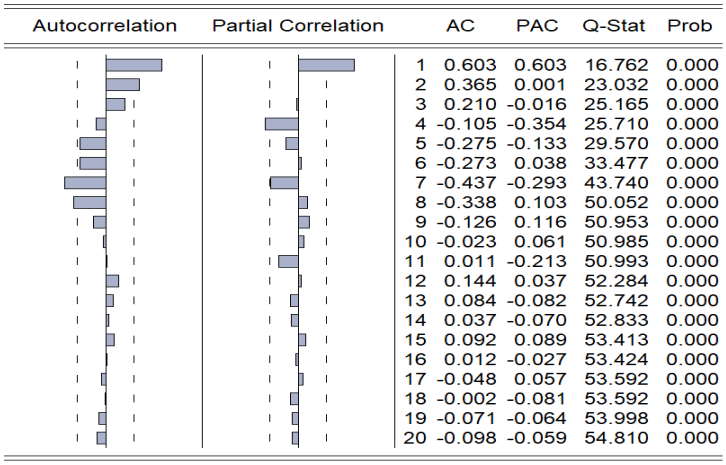

Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
		1	0.603	0.603	16.762	0.000
		2	0.365	0.001	23.032	0.000
		3	0.210	-0.016	25.165	0.000
		4	-0.105	-0.354	25.710	0.000
		5	-0.275	-0.133	29.570	0.000
		6	-0.273	0.038	33.477	0.000
		7	-0.437	-0.293	43.740	0.000
		8	-0.338	0.103	50.052	0.000
		9	-0.126	0.116	50.953	0.000
		10	-0.023	0.061	50.985	0.000
		11	0.011	-0.213	50.993	0.000
		12	0.144	0.037	52.284	0.000
		13	0.084	-0.082	52.742	0.000
		14	0.037	-0.070	52.833	0.000
		15	0.092	0.089	53.413	0.000
		16	0.012	-0.027	53.424	0.000
		17	-0.048	0.057	53.592	0.000
		18	-0.002	-0.081	53.592	0.000
		19	-0.071	-0.064	53.998	0.000
		20	-0.098	-0.059	54.810	0.000

Figure 1: Partial correlation coefficient test

3.3. External events analysis

The model estimation results show that the Shanghai Interbank Offered Rate (Shibor) and New Loan Amount (NLA) are positively correlated with the banker's acceptance exchange yield. Moreover, the banker's acceptance exchange yield is most affected by the short to medium-term funding costs.

The industrial producer price index (PPI), consumer price index (CPI), and discounted volume (DV) are negatively correlated with the banker's acceptance exchange yield. Theoretically, when the industrial production price index (PPI) increases, the production cost of enterprises will increase, and the production cost of enterprises will increase, which leads to an increase in bank acceptance bills. The increase in acceptance supply will cause an increase in the supply of rediscounted bills, increasing banker's acceptance exchange yield. Similarly, an increase in the discounted volume (DA) will cause the banker's acceptance exchange yield to rise due to a decrease in demand for rediscounted bills. Therefore, theoretically, PPI and DV should be positively correlated with the banker's acceptance exchange yield. However, the experimental results are inconsistent with theoretical analysis, possibly due to the limited sample size.

Specifically, for every 1 unit increase in PPI, the banker's acceptance exchange yield will decrease by 0.04 units; for every 1 unit increase in CPI, the banker's acceptance exchange yield will decrease by 0.08 units; for every 1 unit increase in the 1-month Shibor, the banker's acceptance exchange yield will increase by 0.86 units; for every 1 unit increase in the discounted volume(DV), the banker's acceptance exchange yield will decrease by 0.45 units; for every 1 unit increase in the new loans amount(NLA), the banker's acceptance exchange yield will increase by 0.12 units.

4. Conclusions and Recommendations

4.1. Conclusions

Through econometric model analysis, it is found that the banker's acceptance exchange yield is significantly influenced by the short-to-medium-term funding costs and the supply and demand of bills in the market. Among these factors, the Shanghai Interbank Offered Rate (Shibor) has a stronger correlation with the banker's acceptance exchange yield, which is an important influencing factor affecting the banker's acceptance exchange yield.

With the rapid development of the bill market rediscount business, the original credit attributes of the bills gradually weakened, and the capital attributes gradually enhanced. As banks have low default probability and credit risk as endorsers of acceptance bills, the banker's acceptance exchange yield is closely related to funding costs. The revised model shows that the short-to-medium-term funding costs reflected by the Shibor have the greatest impact on the banker's acceptance exchange yield, with a 1-unit increase in the Shibor leading to a 0.86-unit increase in the banker's acceptance exchange yield.

From the perspective of bill supply and demand, an increase in social new loan amounts (NLA) indicates good credit lending conditions among various banks, which in turn weakens the market demand for bills. Some state-owned banks with smaller discounted volumes and larger rediscounted holdings

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recovered their bills by raising the offer price of their bills, leading to an increase in the banker's acceptance exchange yield. Therefore, there is a positive correlation between the new loan amount and the banker's acceptance exchange yield. The revised model indicates that for every 1-unit increase in the new loan amount, the banker's acceptance exchange yield will increase by 0.12 units.

4.2. Recommendations

4.2.1. Strengthen Information Disclosure and Transparency in Bill Market

Information disclosure and transparency in the bill market are crucial for the formation of an effective curve of banker's acceptance exchange yield and for the quantitative analysis of macroeconomic fundamentals, bill supply and demand, funding conditions, external events, and other factors that affect the banker's acceptance exchange yield. It is recommended that the government strengthen market supervision, promote market information disclosure and transparency, and enhance market participants' monitoring of the credit risk and liquidity risk of state-owned banks.

4.2.2. Promote Trend Research in Bills and Support Financing Needs of Real Enterprises

It is recommended that the Shanghai Commercial Paper Exchange, based on the experience of the curves of banker's acceptance exchange yield, expedite the construction of trend models applicable to other small and medium-sized credit entities, such as rural financial institutions, improve the commercial credit rating system, and even extend such applications to the commercial acceptance bill field. On the other hand, extend such information product services to the enterprise side, build a national unified bill platform, especially for various small and micro-enterprises to provide more accurate pricing reference benchmarks, and serve small and micro-enterprises in estimating financing costs, enabling them to better control financing costs.

4.2.3. Improve the Bill Market Pricing Reference Benchmark System

Through the theoretical research of the factors affecting the banker's acceptance exchange yield, improve the bill market pricing mechanism, establish a bill market pricing reference benchmark system, and provide reasonable pricing references for fair value valuation of bill discount, bill discount interest rate pricing, bill innovation products, and other aspects.

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