

Announcement Effect Study of Issuing Tier 2 Capital Bonds on the Stock Price of China Construction Bank

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Abstract

This article uses event study methodology to empirically analyze the announcement effect of China Construction Bank's issuance of Tier 2 capital bonds. The results show that firstly, the announcement of the issuance of Tier 2 capital bonds has a positive impact on the stock price of China Construction Bank, with a positive abnormal return during the event study window. Secondly, the abnormal return is significantly higher from the 6th day to the 14th day after the announcement, indicating that the positive announcement effect occurs approximately one week after the announcement and lasts for one week. Based on these findings, policy recommendations are proposed: Firstly, China Construction Bank should choose an appropriate opportunity to issue Tier 2 capital bonds to achieve the goal of reducing capital costs and increasing the bank's market value. Secondly, regulatory authorities should strengthen supervision to prevent insider trading and enhance financial market reform. Thirdly, short-term investors can choose to buy after the announcement of the issuance of Tier 2 capital bonds by China Construction Bank and sell around 14 days after the announcement to obtain abnormal returns.

Keywords: Tier 2 capital bonds Announcement effects China Construction Bank

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Tier 2 capital bonds are important capital instruments for commercial banks to enhance their capital adequacy ratios after the subprime crisis. They have features such as subordination clauses, write-down clauses, and early redemption clauses, with repayment priority after other liabilities and before equity capital. The unique characteristics of tier 2 capital bonds have various impacts on commercial banks, including the announcement effect of issuing tier 2 capital bonds on the stock price of commercial banks. This paper selects China Construction Bank as the research object to study the announcement effect of issuing tier 2 capital bonds by China Construction Bank and provides policy recommendations based on the findings.

1. Introduction

1.1 Research Background and Significance

1.1.1 Research Background

After the subprime crisis in 2008, Basel III introduced higher requirements for commercial banks' capital adequacy ratios. Tier 2 capital bonds emerged as important capital instruments for commercial banks to supplement tier 2 capital. Tier 2 capital bonds have subordination clauses, write-down clauses, and early redemption clauses. Their repayment priority is after other liabilities and before equity capital. When a bank faces bankruptcy, tier 2 capital bonds can be written down. Internationally, contingent convertible bonds and write-down bonds fall into the category of Chinese tier 2 capital bonds. Unlike foreign banks' tier 2 capital bonds, which have distinctions such as convertible or write-down types, maturity or perpetual types, and different safety-trigger levels, as well as the complex structure of regulatory capital including additional tier 1 and tier 2 capital, Chinese banks' tier 2 capital bonds have a simple structure, with only maturity-type tier 2 capital bonds, and almost all are write-down.

The issuance of Chinese tier 2 capital bonds started in 2014. By 2022, the overall trend has been an increase in the number of issued tier 2 capital bonds, the scale of issuance, the number of issuing banks, and the participation of small and medium-sized banks. In 2022, Chinese commercial banks issued a total of 92 tier 2 capital bonds (including multiple tranches), with a year-on-year increase of 24.66% compared to 2021. The issuance scale of tier 2 capital bonds during the year reached 907.755 billion yuan, a significant increase of 47.58% compared to 615.073 billion yuan in 2021.

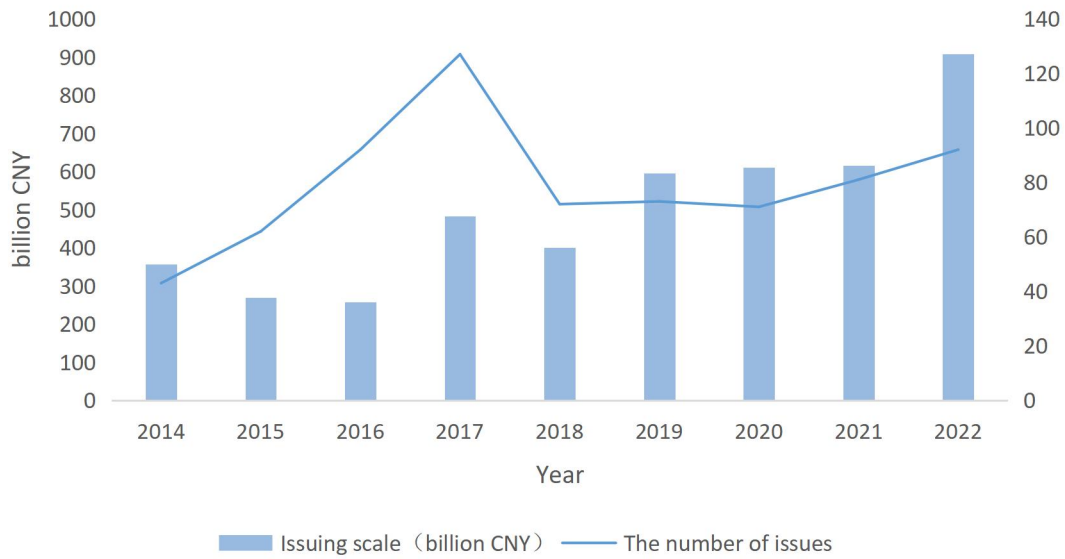


Figure 1. Issuance Situation of Tier 2 Capital Bonds in China

As China's capital market gradually matures and becomes more efficient, the relevance of corporate information to stock prices increases. Commercial banks are unique entities, and the information conveyed through the issuance of tier 2 capital bonds can also be reflected in their stock prices. Therefore, the impact of issuing tier 2 capital bonds by commercial banks is not only evident in capital and risk management but also in the market value of their stocks, indicating the possibility of an announcement effect.

1.1.2 Significance of the Study

This paper focuses on China Construction Bank as the research subject and analyzes the announcement effect of its tier 2 capital bond issuance. The study holds the following important significance: Firstly, China Construction Bank is one of the six largest state-owned banks in China and is also a globally significant systemically important bank. Researching the announcement effect of its tier 2 capital bond issuance contributes to a better understanding of the reasons and motives behind the issuance of tier 2 capital by large state-owned banks like China Construction Bank, and explores whether the issuance announcements contain information about the bank's financial status and future prospects. Secondly, it helps China Construction Bank enhance its understanding of the impact of tier 2 capital bond issuance on its stock price, allowing the bank to choose the most suitable capital supplementation tool to achieve a "win-win" situation of reducing financing costs and increasing the bank's market value. Thirdly, as a systemically important bank, China Construction Bank is subject to close regulatory scrutiny. Understanding the market effects of its tier 2 capital bond issuance enables regulatory authorities to promptly and effectively respond to potential regulatory violations behind any abnormal stock price fluctuations. Lastly, for investors in China Construction Bank, this study helps them understand the impact of announcements on the bank's stock returns, providing a reference for adjusting investment strategies and constructing investment portfolios.

1.2 Literature Review

1.2.1 Characteristics and impacts of tier 2 capital bonds of Chinese commercial bank

China's secondary capital bond market started in 2013, and since then, the number of studies on secondary capital bonds by domestic scholars has gradually increased. Zhao Yingjie (2013) analyzed the background and defined the meaning of write-down bonds, discussed the structural design of write-down bonds, domestic and international case studies of write-down bonds, and the regulatory challenges they bring. Li Xiaoping et al. (2014) pointed out that Chinese commercial banks should focus on innovation and issuance of other Tier 1 and Tier 2 capital instruments. Xie Ting and Zhong Wei (2014) drew on international experience and proposed that in order to solve the problem of insufficient capital adequacy ratio, regulatory authorities in China should promote the issuance of preferred stocks and write-down subordinated debt by commercial banks to meet their capital needs. Luo Pengfei et al. (2018) studied the design of write-down Tier 2 capital bonds and the optimal debt structure of banks under tax rate uncertainty. They found that from the perspective of maximizing the bank's total value, decision-makers should increase the proportion of write-down Tier 2 capital bonds among all issued bonds; from the perspective of tax shield effect, when the country implements tax reduction policies, if decision-makers want to reduce leverage, they should decrease the proportion of Tier 2 capital bond issuance; if they want to increase leverage, they should increase the proportion of Tier 2 capital bond issuance. When implementing tax increase policies, the opposite holds true. Xiong Qiyue and Jia Xiangfu (2018) pointed out that for the capital supplement of large Chinese commercial banks, the scale of ineligible Tier 2 capital instruments is relatively large, resulting in the greatest pressure on Tier 2 capital supplementation. Feng Ye (2021) pointed out that Tier 2 capital bonds are the most important capital supplement tool for small and medium-sized banks in China.

Due to large commercial banks in China primarily raising funds through equity financing, there has been relatively little research by domestic scholars on the issuance of tier 2 capital bonds by large commercial banks. Xie Meng and Fan Longzhen (2018) found that for large commercial banks, the impact of surplus management on the issuance spread of tier 2 capital bonds is small and beneficial for these banks to manage their surpluses and maximize profits. Liu Ju (2022), through empirical analysis of 15 large commercial banks and 21 small and medium-sized commercial banks, found that the issuance of tier 2 capital bonds has a smaller impact on enhancing the profitability of large commercial banks compared to small and medium-sized banks.

Currently, there is limited research on the announcement effect of tier 2 capital bonds on commercial banks in China, and the results vary significantly due to differences in research subjects. Tan Yingxian and Yang Zhaojun (2017) argue that by designing convertible bonds with reasonable conversion rates, it is possible to address the underinvestment problem and the risk transfer issue raised by Myers (1977), thereby conveying investment signals to external investors. Therefore, the issuance of tier 2 capital bonds has a positive announcement effect. He Ludan (2021) studied the impact of issuing tier 2 capital bonds on China Bank and found that it helps improve the capital adequacy ratio of China Bank, enhances its short-term financing capacity,

reduces the pressure for refinancing in the secondary market, optimizes the capital structure, and has a positive announcement effect on China Bank's stock price. Using the stock returns of Chinese listed banks from 2014 to 2019 as the research sample, Yu Guanfeng (2020) concluded that the issuance of tier 2 capital bonds has a negative announcement effect on commercial bank stocks. As for the research on the redemption of tier 2 capital bonds, there is very little available literature. Among the existing domestic literature, only Yang Yuqi (2021) pointed out that the redemption announcement of tier 2 capital bonds has a temporary negative impact on stock prices, with overall weak significance on trading volume.

In China, qualitative studies on tier 2 capital bonds are predominant, mainly analyzing the characteristics and impacts of tier 2 capital bonds and providing recommendations for the issuance of such bonds by commercial banks based on the background of existing literature. The research primarily focuses on small and medium-sized banks, with very few empirical studies specifically targeting large commercial banks. The research on large commercial banks mainly examines the impact of issuing tier 2 capital bonds on their profitability. The research on the announcement effect of tier 2 capital bond issuances on commercial banks is also limited, with different scholars drawing different conclusions based on different samples, and there is no unified viewpoint yet.

1.2.2 The announcement effects of CoCos of commercial banks

The impact of issuing secondary capital bonds on the value of commercial banks has two sides. On the negative side, T Azarmi (2015) suggests that convertible bonds may lower the bank's goodwill and enterprise value. Thomas Walther and Tony Klein (2015) find that the issuance of tier 2 capital bonds increases management's incentive for risk-taking but does not lead to an improvement in the firm's value. Philippe Oster (2019) argues that the discovery of contingent convertible bonds may create moral hazard risks, such as managers and shareholders preferring higher risk-taking or accepting increased asset volatility due to the high wealth transfer risk to CoCo holders.

On the positive side, Pennacchi et al. (2014) find that the design of tier 2 capital bonds helps commercial banks avoid debt overhang and reduces the risk of financial crises. Piotr Jaworski et al. (2017) suggest that contingent convertible bonds, compared to traditional bonds, enhance a bank's ability to meet obligations. Liebenberg and van Vuuren (2017) find that if the trigger clause of contingent convertible bonds is appropriately designed, it can provide countercyclical capital assets for commercial banks and other financial sectors to weather economic contractions. Andrea Consiglio and Stavros A. Zenios (2018) develop a risk management model demonstrating that contingent convertible bonds can improve a country's debt risk situation by preventing tail risks. LI Ping et al. (2022) point out that when the equity capital of commercial banks reaches a certain proportion, the write-down feature of tier 2 capital bonds can reduce liquidity risk and avoid bankruptcy, thereby increasing the value of the banking system.

C. Schmidt, José Fajardo, and Layla Mendes (2020) pointed out that large banks and highly leveraged banks are more inclined to issue contingent convertible bonds (CoCos) as an important tool to meet the capital adequacy requirements of Basel III. Additionally, CoCos exhibit strong spillover effects. Fangfang Li et al. (2020) found that CoCos issued by European commercial banks are positively correlated with bonds and stocks, and they have a strong spillover effect, indicating that the issuance

of CoCos by commercial banks affects their overall external financing situation. Furthermore, CoCos have a stronger impact on stock prices compared to regular bonds. When systemically important banks face bankruptcy risks, the correlation between the entire capital market and financial products increases.

Scholars conducted studies on the announcement effects of CoCos as early as 2016. Qunfeng Liao et al. (2016) examined the announcement effects of issuing CoCos by financial institutions by calculating excess returns and found that the global investors' reactions to CoCos are generally negative, but there are significant differences among investors from different countries, leading to international arbitrage. Ammann et al. (2017) discovered that after the announcement of CoCos issuance, stocks generate positive excess returns, while credit default swap spreads generate negative excess returns.

The research findings in this section can be summarized as follows: the negative and positive impacts of issuing CoCos on commercial banks, the relationship between large commercial banks and CoCos, and the announcement effects of CoCos issuance. The adverse impact of issuing CoCos is that it increases the risk-taking incentives of bank management and shareholders, thereby reducing the value of commercial banks. The beneficial impact is that it can enhance the liquidity, solvency, and capital adequacy of commercial banks, thereby reducing the risk of bankruptcy and enabling them to weather economic downturns smoothly. Compared to regular bonds, CoCos have stronger spillover effects and greater impact on stock prices, making them more preferred by large commercial banks and leveraged banks. The announcement effects of CoCos issuance vary significantly among different entities and countries, but the majority of financial institutions experience negative announcement effects when issuing CoCos.

1.3 Methodology

This study employs the event study method. The event study method is a research approach to examine whether specific events have an impact on stock prices. It determines the correlation between events and stock prices by analyzing the excess returns generated by stocks before and after the events. The event day is designated as $t=0$, and the event study window is defined as $[T_1, T_2]$, including T_1 days before the event and T_2 days after the event. The estimation window is set as $[T_0, T_1]$, covering T_0 days before the event until T_1 days. The general market model or CAPM model is used to estimate the relationship between the target stock's returns and the market returns using the sample data from the estimation window. Subsequently, the predicted returns of the target stock during the event study window are calculated, and the difference between the actual returns and the predicted returns during the estimation window represents the excess returns generated by the event. The significance of the excess returns is tested to determine the impact of the event on stock prices.

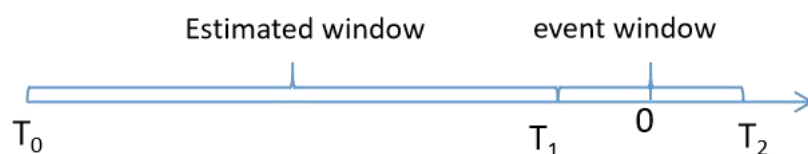


Figure 2. Explanation of Event Study Method Window

2. Overview of China Construction Bank and Its Tier 2

Capital Bonds

2.1. China Construction Bank

China Construction Bank (CCB) was established in September 1954, specializing in basic construction appropriations and lending. In 1994, it became one of the four state-owned banks in China. The bank underwent a shareholding reform in September 2004 and was listed on the Hong Kong Stock Exchange (H shares) in 2005 and on the Shanghai Stock Exchange (A shares) in 2007. Following the shareholding reform, CCB gradually emerged as a leading bank in the industry. In 2010, with a profit of \$20.3 billion, CCB became the second most profitable bank globally, trailing only Industrial and Commercial Bank of China (ICBC) with a profit of \$24.5 billion. Since 2014, CCB has consistently ranked second in The Banker's annual rankings. In 2022, its Tier 1 capital reached CNY 2,846.533 billion, and its operating income reached CNY 822.473 billion.

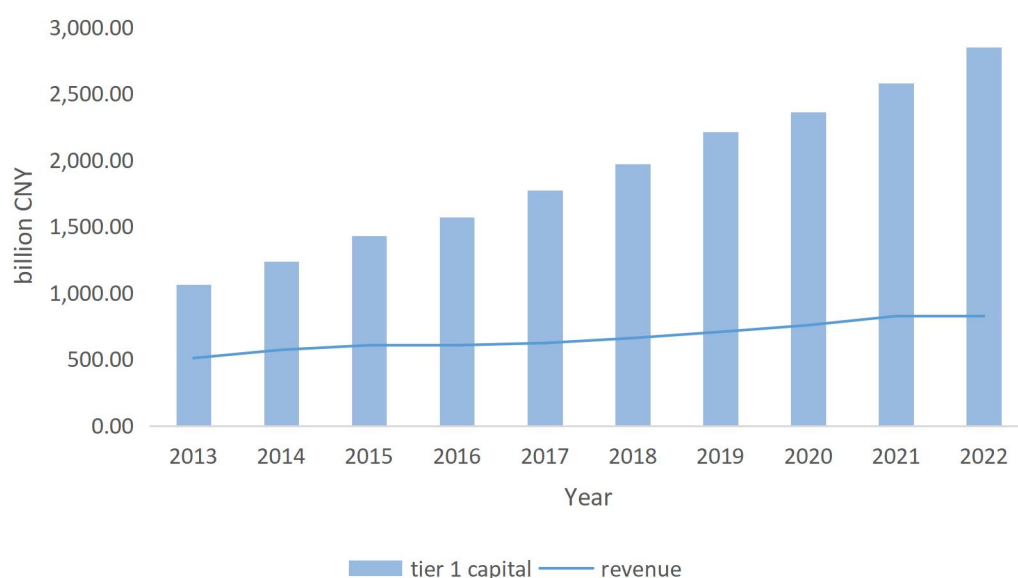


Figure 3. The tier 1 capital and the revenue of CCB from 2013 to 2022

After the 2008 subprime mortgage crisis, the Basel Committee recognized the importance of systemically important banks in preventing global systemic financial crises. As capital serves as the last line of defense for commercial banks against risks, Basel III introduced stricter capital adequacy requirements for systemically important banks. China Construction Bank (CCB), being highly active globally, large in scale, low in substitutability, and complex, was designated as a global systemically important bank in 2015. This significantly increased the urgency for CCB to enhance its capital adequacy. Therefore, starting from 2014, CCB has been issuing Tier 2 capital bonds to supplement its Tier 1 capital and meet regulatory capital requirements. As shown in Figure 6, since the issuance of Tier 2 capital bonds by CCB, its capital adequacy ratio has shown an overall upward trend.

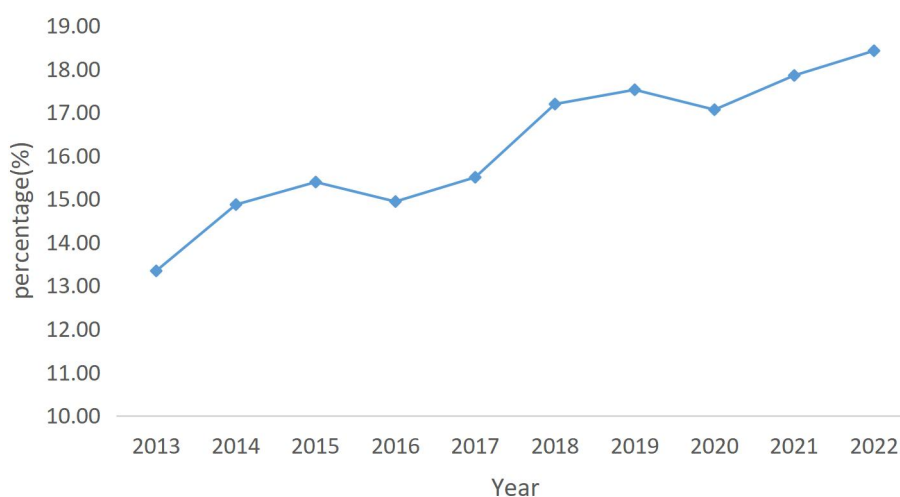


Figure 4. The capital adequacy ratio of CCB from 2013 to 2022

2.2 Basic Elements and Characteristics of Tier 2 Capital Bonds

Tier 2 capital bonds have several fundamental elements, including coupon rate, issuance size, face value, redemption conditions, and trigger mechanisms. The coupon rate is mostly fixed, and the interest payment frequency can be monthly, semi-annually, or annually, without rate step-up mechanisms or other redemption incentives. The issuance size is the total amount obtained by multiplying the total number of bonds issued by the face value of each bond. The issuance period refers to the maximum duration the bond can exist under the assumption that it has not triggered any trigger mechanisms. Redemption provisions refer to the issuer's right to redeem the bonds in advance. Currently, Chinese Tier 2 capital bonds generally have redemption periods of five years for ten-year bonds and ten years for fifteen-year bonds.

Tier 2 capital bonds, as capital supplementation instruments, have the following characteristics:

1. The raised funds are solely used to supplement banks' Tier 2 capital and cannot be used for lending purposes.
2. Compared to equity financing, the cost of raising funds is lower, and it does not dilute shareholders' equity.
3. Compared to regular bonds, the cost of raising funds is higher, and commercial banks bear higher interest payment pressures.
4. They include subordination and write-down provisions, which entail greater risks for investors. For commercial banks, the existence of write-down provisions can reduce their debt repayment risks during financial crises.

2.3 Overview of China Construction Bank's Tier 2 Capital Bond Issuance

China Construction Bank (CCB) commenced the issuance of Tier 2 capital bonds on August 15, 2014. To date, CCB has issued a total of 11 series and 17 varieties of Tier 2 capital bonds. Currently, only 15 CCB Tier 2 bonds have reached their redemption

periods and have been redeemed. As shown in Table 1, CCB's issuance frequency of Tier 2 capital bonds is not high, but each issuance has reached a substantial scale of over hundreds of billions. Before 2020, CCB did not frequently utilize Tier 2 capital bonds as a capital supplementation tool, and the variety of issued Tier 2 capital bonds was relatively limited. In 2021, CCB had the highest issuance frequency, largest scale, and most varieties of Tier 2 capital bonds, with a total fundraising of 145 billion yuan. This was due to the following reasons: liquidity constraints caused by the COVID-19 pandemic limited other capital channels for fundraising; systemically important banks needed to increase their capital adequacy ratios and guard against financial risks in the context of economic downturns, thereby stabilizing the financial system and public expectations.

Table 1. The issuance of Tier 2 capital bonds of CCB

Abbreviation	Announcement	Maturity	Call date	Coupon rate	Real issuing scale	Repurchase
14 Tier 2 capital bond of CCB01	August 15, 2014	15 years	At the end of the 10th	5.98%	20 billion	Not repurchased
15 Tier 2 capital bond of CCB	December 18, 2015	10 years	At the end of the 5th	4.00%	24 billion	repurchased
18 Tier 2 capital bond of CCB01	September 25, 2018	10 years	At the end of the 5th	4.86%	43 billion	Not repurchased
18 Tier 2 capital bond of CCB02	October 29, 2018	10 years	At the end of the 5th	4.70%	40 billion	Not repurchased
20 Tier 2 capital bond of CCB	September 14, 2020	10 years	At the end of the 5th	4.20%	65 billion	Not repurchased
21 Tier 2 capital bond of CCB01_1	August 10, 2021	10 years	At the end of the 5th	3.45%	65 billion	Not repurchased
21 Tier 2 capital bond of CCB01_2	August 10, 2021	15 years	At the end of the 10th	3.80%	15 billion	Not repurchased
21 Tier 2 capital bond of	November 9, 2021	10 years	At the end of the 5th	3.60%	35 billion	Not repurchased

CCB02_1						
21 Tier 2 capital bond of CCB02_2	November 9, 2021	15 years	At the end of the 10th	3.80%	10 billion	Not repurchased
21 Tier 2 capital bond of CCB03_1	December 14, 2021	10 years	At the end of the 5th	3.48%	120 billion	Not repurchased
21 Tier 2 capital bond of CCB03_2	December 14, 2021	15 years	At the end of the 10th	3.74%	80 billion	Not repurchased
22 Tier 2 capital bond of CCB01_1	June 17, 2022	10 years	At the end of the 5th	3.45%	45 billion	Not repurchased
22 Tier 2 capital bond of CCB01_2	June 17, 2022	15 years	At the end of the 10th	3.65%	150 billion	Not repurchased
22 Tier 2 capital bond of CCB02_1	November 7, 2022	10 years	At the end of the 5th	3.00%	250 billion	Not repurchased
22 Tier 2 capital bond of CCB02_2	November 7, 2022	15 years	At the end of the 10th	3.34%	150 billion	Not repurchased
23 Tier 2 capital bond of CCB01_1	March 28, 2023	10 years	At the end of the 5th	3.49%	50 billion	Not repurchased
23 Tier 2 capital bond of CCB01_2	March 28, 2023	15 years	At the end of the 10th	3.61%	150 billion	Not repurchased

3. Theoretical Basis for the Impact of Tier 2 Capital Bonds on Commercial Bank Stock Prices

3.1 Pecking Order Theory and Signaling Effect

The pecking order theory, proposed by Myers and Majluf (1984), suggests that the choice of financing method is determined by the cost of financing. Due to the lower cost of internal financing compared to debt financing and lower cost of debt financing compared to equity financing, companies prioritize internal financing, followed by debt financing, and finally equity financing.

Due to asymmetric information, investors, lacking relevant information about the company compared to the management, cannot assess the company's value. They believe that if a company raises equity financing, it means it cannot raise funds through debt financing. For the management, when the company's stock price is undervalued, it cannot raise sufficient funds through equity financing, so it resorts to debt financing. When the stock price is overvalued, equity financing can raise more funds. This creates a signaling effect for investors. When a company issues debt for financing, investors interpret it as a positive signal, leading to stock purchases and an increase in stock prices.

3.2 Modigliani-Miller Theorem and Trade-off Theory

Modigliani and Miller (1963) proposed the Modigliani-Miller theorem with taxes. According to this theorem, for two companies with the same pre-tax profits, a leveraged company with debt (VL) has a higher value than an unleveraged company (VU), i.e., $V_L = V_U + TB$. The higher the debt, the stronger the tax shield effect, resulting in a higher company value. This suggests that companies should maximize their value by taking on more debt.

However, according to the trade-off theory (Robichek and Myers, 1966), considering the costs of financial distress, debt becomes risky as the debt ratio increases, leading to an increase in the cost of debt, which in turn reduces the company's value.

To maximize the company's value, the trade-off between tax shield and financial distress costs should be considered. Tier 2 capital bonds, with their write-down features, allow commercial banks to convert them into capital or avoid repayment of principal and interest in the event of a financial crisis. This reduces the financial distress costs caused by debt issuance and can increase the company's value.

3.3 Debt Overhang Effect

Pennacchi and Vermaelen (2014) found that Tier 2 capital bonds can help issuers avoid debt overhang and invest in projects with positive net present value. When a commercial bank faces a crisis and cannot weaken its capital, it needs to increase its capital adequacy ratio to meet regulatory requirements. However, if investor confidence is low, the bank cannot raise funds through equity issuance. Capital shortage forces the bank to reduce lending or abandon projects with positive net present value, further exacerbating the crisis. If the bank issues Tier 2 capital bonds, it can trigger conversion or write-down clauses in times of crisis, avoiding the problem of insufficient capital adequacy ratio due to debt squeeze. This maintains attractiveness for both stock and bond investors.

3.4 Agency Problem and Cash Flow Effect

Jensen (1986) pointed out in his research on agency costs that agency costs can cause fluctuations in stock prices. The separation of ownership and control, asymmetric information, conflicting interests, and incomplete contracts give rise to agency problems between shareholders and management. The greater the power held by the management, and the more freely available cash flows, the greater the likelihood of them acting in their own interests at the expense of shareholders. Debt financing, with more constraints compared to equity financing, reduces the amount of cash flows available for management to freely use, mitigating agency problems and benefiting shareholder interests, thereby increasing stock prices.

3.5 Risk-taking Effect

Foreign studies have found that in incomplete markets, the issuance of Tier 2 capital bonds with convertible features by commercial banks motivates shareholders to take on greater risks, and the probability of risk occurrence remains positive after conversion, resulting in losses for the banks.

In China, most Tier 2 capital bonds do not have convertible features, so domestic studies focus more on the relationship between Tier 2 capital bonds and managerial risk-taking. Tan Yingxian et al. (2017) found through quantitative analysis that issuing Tier 2 capital bonds can increase a company's value by reducing bankruptcy probability but significantly increases managerial risk-taking. Effective design of cash compensation can curb this motivation. Not only can bank shareholders choose managerial compensation in the form of cash or equity incentives to regulate managerial risk-taking, but bank regulatory authorities can also control the risk of the banking system by adjusting the trigger level for write-down bonds.

4. Mechanism Analysis of Announcement Effect Generated by China Construction Bank's Issuance of Tier 2 Capital Bonds

4.1 Issuing Tier 2 Capital Bonds Leads to Positive Announcement Effect

4.1.1 Tax shield effect boosts China Construction Bank's stock price

As a globally systemically important bank, China Construction Bank needs to raise capital to meet high capital adequacy ratio requirements, making the choice of capital instruments crucial. When the amount of funds raised is the same, issuing Tier 2 capital bonds can increase China Construction Bank's stock price compared to equity financing. Assuming China Construction Bank replaces equity financing with Tier 2 capital bonds (issuing Tier 2 capital bonds and redeeming equivalent value of stocks), let P_0 be the stock price before redemption, N_0 be the number of shares, S_0 be the equity capital, and B_0 be the debt capital. After redemption, let P_1 be the stock price, N_1 be the number of shares, S_1 be the equity capital, and B_1 be the debt capital. Since equity capital is equal to the product of the number of shares and the stock price, we have:

$$S_0 = N_0 \times P_0 \quad (1)$$

$$S_1 = N_1 \times P_1 \quad (2)$$

According to the Modigliani-Miller theorem with taxes, the following relationship holds:

$$S_0 + B_0 - TB_0 = V_{L0} - TB_0 = V_U = V_{L1} - TB_1 = S_1 + B_1 - TB_1 \quad (3)$$

The post-redemption stock price should be equal to the redemption price, and the redemption price multiplied by the redemption quantity equals the increase in debt capital.

$$(N_0 - N_1)P_1 = B_1 - B_0 \quad (4)$$

By substituting (1) and (2) into (3), we obtain:

$$N_0 \times P_0 - N_1 \times P_1 = (1 - T)(B_1 - B_0) \quad (5)$$

By substituting (5) into (4), we obtain the relationship between P_0 and P_1 as:

$$P_1 = \frac{N_0}{T N_1 + (1 - T) N_0} \times P_0 \quad (6)$$

The number of redeemed shares must be less than the number of shares before redemption, so $T N_1 + (1 - T) N_0$ is less than N_0 . It can be observed that P_1 must be greater than P_0 because the interest expense of Tier 2 capital bonds is deductible before taxes. The issuance of Tier 2 capital bonds by China Construction Bank allows the bank to receive tax refunds from the government, increasing the bank's value.

4.1.2 Positive signals attract investors to buy

Due to the existence of information asymmetry, investors find it difficult to make precise judgments about the operating conditions of commercial banks. When China Construction Bank issues Tier 2 capital bonds, investors perceive it as an indication that the bank's stock price is undervalued. Therefore, they tend to buy stocks for value investment, leading to an increase in stock prices.

4.1.3 Reducing bankruptcy risk attracts investors

When a commercial bank undergoes bankruptcy liquidation, common shareholders have the lowest priority in terms of repayment, following creditors and preferred shareholders. This means that common shareholders bear the greatest loss if the bank goes bankrupt. Tier 2 capital bonds not only supplement China Construction Bank's capital adequacy ratio and enhance its ability to handle credit risks but also, due to the existence of write-down provisions, can trigger the activation of these provisions during a crisis. This lowers China Construction Bank's debt burden and reduces the likelihood of bankruptcy liquidation, thus reducing the risk for stock investors and attracting more investors to buy, thereby driving up stock prices.

4.2 The issuance of Tier 2 capital bonds leads to negative announcement effects

4.2.1 Risk increases due to risky investments

As Tier 2 capital bonds include write-down provisions that reduce the debt repayment pressure on commercial banks during a crisis, major shareholders and management may be motivated to take higher risks and engage in riskier business activities, increasing the likelihood of future losses and harming the interests of minority shareholders. Due to risk aversion, retail investors holding China Construction Bank stocks may interpret the issuance of Tier 2 capital bonds as a signal of increased future operational risks, leading them to sell stocks and causing a decline in stock prices.

5. Research Design

5.1 Announcement Date

From an economic perspective, the announcement effect usually refers to the impact of the disclosure of significant information about listed companies on the stock price of the underlying securities. The academic research on announcement effects mainly focuses on the impact of stock dividend issuance, cash dividends, mergers and acquisitions, and earnings information disclosure on the stock prices of underlying securities. Since this study focuses on Tier 2 capital bonds, the announcement effect here refers to how the announcement of China Construction Bank issuing Tier 2 capital bonds affects the market trend of its stock price, either increasing or decreasing the stock price of the issuer.

There are two main types of selection for the announcement date: one is the day when the issuance plan is announced, and the other is the day when the issuer officially announces the decision to issue bonds on the official website. By comparing these two time points, it can be found that the day of the issuance plan announcement reflects the issuer's intention to alleviate regulatory capital pressure by issuing Tier 2 capital bonds. On the day of the Tier 2 capital bond issuance announcement, investors can obtain more information about the issued bonds, such as the issuance size and coupon interest rate, from the announcement and prospectus. At this point, the announcement reflects more information to investors, such as the issuer's future development strategy, profitability, and the value that the issuance of Tier 2 capital bonds can bring to the issuer. Therefore, using the announcement date of the issuance announcement as the event day for research is more reasonable, as the announcement effect on this day can reflect more information, and it represents established facts.

5.2 Sample Selection and Measurement of Announcement Effect

The data for this study is obtained from the Wind database, and the sample data consists of the stock prices of China Construction Bank and the Shanghai-Shenzhen 300 Index from January 1, 2014, to May 1, 2023. The event study method is used to analyze the announcement effect of China Construction Bank issuing Tier 2 capital bonds.

5.2.1 Determination of Event Date and Window Period

The event in this study is the announcement of the issuance of Tier 2 capital bonds. The day when China Construction Bank announces the information disclosure of the Tier 2 capital bond issuance is selected as the event date. The estimation window is set as the 180 trading days before T1, and the study window is set as [-15,15].

5.2.2 Calculation of Normal Returns and Abnormal Returns

The CAPM model is used to calculate the normal returns of China Construction Bank's stocks. The model is set as:

$$R_{it} - R_{ft} = \beta_i \times (R_{mt} - R_{ft}) + \varepsilon_{it} \quad (7)$$

In the equation, R_{it} represents the normal return of sample i on day t , R_{ft} represents the risk-free rate on day t , which is taken as the daily interest rate of the 10-year government bond issued by the Chinese central government. This satisfies the requirement of a risk-free rate without default risk or investment restrictions. R_{mt} represents the market return on day t . Following the study by Yang Chao (2019), the daily return of the Shanghai-Shenzhen 300 Index is used as the market return. β_i represents the sensitivity of China Construction Bank's stock to market risk, and ε_{it} represents the error term. By using the data from the estimation window period and conducting OLS regression for each event sample, β_i can be obtained.

Table 2 Results of estimation and significance test

Abbreviation	Coefficient	T-Statistic
14 Tier 2 capital bond of CCB01	0.5301	9.0265
15 Tier 2 capital bond of CCB	0.7103	11.6983
18 Tier 2 capital bond of CCB01	0.9850	10.1127
18 Tier 2 capital bond of CCB02	1.0080	11.6864
20 Tier 2 capital bond of CCB	0.2434	5.2738
21 Tier 2 capital bond of CCB01	0.3815	4.7649
21 Tier 2 capital bond of CCB02	0.3423	4.2120
21 Tier 2 capital bond of CCB03	0.3472	4.7559
22 Tier 2 capital bond of CCB01	0.2656	5.1516
22 Tier 2 capital bond of CCB02	0.2409	5.4911
23 Tier 2 capital bond of CCB01	0.2461	5.0605

It can be observed that the regression coefficients of each event sample are significant, and the CAPM model can be used to calculate the expected return of each sample

during the event study window. Based on this, the abnormal return (AR) can be calculated.

The abnormal return (AR) is defined as the difference between the actual return of the stock and the expected return. The daily abnormal return of China Construction Bank's stock can be represented as:

$$AR_{it} = R_{it} - E_{it} \quad (8)$$

Where AR_{it} represents the abnormal return of sample i on day t , R_{it} represents the actual return of China Construction Bank's stock, and E_{it} represents the expected return of China Construction Bank's stock.

The average abnormal return (AAR) represents the average of the sum of abnormal returns for n samples on day t :

$$AAR_t = \frac{\sum_{i=1}^n AR_{it}}{N} \quad (9)$$

The cumulative abnormal return (CAR) is the sum of abnormal returns for a sample company during the event window:

$$CAR (T_1, T_2) = \sum_{T_1}^{T_2} AR_{it} \quad (10)$$

The average cumulative abnormal return (CAAR) is calculated by adding and averaging the AARs over the (T_1, T_2) period:

$$CAAR (T_1, T_2) = \frac{\sum_{T_1}^{T_2} AAR_t}{T_2 - T_1 + 1} \quad (11)$$

Table 3 Variable

Name	Explanation
R_{ft}	The actual return of CCB' s stock on day t .
R_{mt}	The market return is the return of the Shanghai and Shenzhen 300 index on day t .
R_{ft}	The riskless rate is the daily interest rate on the yield to maturity of 10-year Chinese central government bonds.
E_{it}	The expected return is a stock return forecast based on the regression equation.
AR_{it}	The abnormal return is the difference between the actual return and the expected return.
CAR_{it}	The cumulative abnormal return is the sum of abnormal return of samples
AAR_{it}	The average abnormal return is the average of the sum of the abnormal return of samples.

CAAR _{it}	The cumulative average abnormal return is the sum of average abnormal return of samples
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6. Empirical Analysis

6.1 Analysis of Announcement Effect

6.1.1 AAR Empirical Results Analysis

Based on the data obtained in Table 4, it can be observed that during the event study window, all AAR values of China Construction Bank's stock are positive, with a value of 0.2855% on the announcement day. Overall, the average AAR in the 15 days before the announcement is 0.2918%, while the average AAR in the 15 days after the announcement is 0.3486%, indicating an increase compared to the pre-announcement level.

In the 15 days before the announcement, only the 11th and 6th days prior to the announcement have significantly positive AAR values at the 10% and 5% levels, reaching 0.3977% and 0.3172% respectively.

After the announcement, the number of significantly positive AAR days noticeably increases. The first significant positive AAR is observed on the 2nd day after the announcement, with an abnormal return of 0.3317%. Starting from the 6th day after the announcement, China Construction Bank's stock consistently generates significantly positive abnormal returns, which continue until around the 14th day. During the 15 days after the announcement, there are 4 days with significant positive AAR at the 10% level, 1 day at the 5% level, and 1 day at the 1% level. The 13th day after the announcement has the highest abnormal return, reaching 0.5260%. The 10th day after the announcement has the highest significance level, with a significant abnormal return of 0.4359% at the 1% level.

Table 4 AAR in event windows

Date	ARR (%)	T-Statistic	Prob.
-15	0.4588	1.697	0.1205
-14	0.2455	1.3784	0.1981
-13	0.0726	0.1199	0.907
-12	0.4709	0.3255	0.7515
-11	0.3977*	2.0181	0.0712
-10	0.2059	-0.1408	0.8909
-9	0.1974	1.4859	0.1681
-8	0.0559	-0.2672	0.7947
-7	0.4116	0.7207	0.4876
-6	0.3172**	2.7013	0.0223
-5	0.0333	-0.0837	0.935
-4	0.2982	0.2805	0.7848
-3	0.4140	1.5251	0.1582
-2	0.4329	1.2752	0.2311
-1	0.3645	1.321	0.2159

0	0.2855	0.9558	0.3617
1	0.3486	1.3508	0.2065
2	0.3317*	1.9969	0.0738
3	0.2481	1.6381	0.1324
4	0.2529	0.6749	0.5151
5	0.3407	1.8095	0.1005
6	0.1963*	1.9903	0.0746
7	0.3620	0.5136	0.6187
8	0.2408*	2.1198	0.06
9	0.2935	-0.6412	0.5358
10	0.4359***	3.574	0.0051
11	0.2313	0.6032	0.5598
12	0.4903**	2.3298	0.0421
13	0.5260*	1.8517	0.0938
14	0.3412	1.7085	0.1183
15	0.2619	0.7214	0.4872

In summary, after the announcement of China Construction Bank's issuance of Tier 2 capital bonds, the number of significantly positive AAR days for its stock increases, and the overall level of AAR rises. This indicates a positive announcement effect for the issuance of Tier 2 capital bonds by China Construction Bank. The first significant positive AAR appears on the 2nd day after the announcement, followed by a slight decline and a subsequent continuous presence from the 6th day after the announcement until around the 14th day.

6.1.2 CAAR Empirical Results Analysis

As shown in Table 5, during the event study window, the CAAR for China Construction Bank is consistently positive and exhibits an upward trend. It becomes significant starting from the 13th day before the announcement and reaches an average cumulative abnormal return of 4.6619% at the 1% significance level on the announcement day. The CAAR remains significant at the 1% level after the announcement. The average CAAR in the 15 days before the announcement is 4.3764%, indicating a relatively slow growth. However, the average CAAR increases by 4.9011% in the 15 days after the announcement, suggesting a faster growth rate and indicating that the announcement of the issuance leads to higher average cumulative abnormal returns for China Construction Bank's stock.

Table 5 CAAR in event windows

Date	CARR (%)	T-Statistic	Prob.
-15	0.4588	1.697	0.1205
-14	0.7043	1.7631	0.1084
-13	0.7769**	2.2829	0.0456

-12	1.2477*	1.8566	0.093
-11	1.6454**	2.2385	0.0491
-10	1.8514**	2.8131	0.0184
-9	2.0488***	3.4801	0.0059
-8	2.1046**	3.0617	0.012
-7	2.5162**	2.8743	0.0165
-6	2.8334***	3.5947	0.0049
-5	2.8667***	3.2286	0.009
-4	3.1649**	2.8975	0.0159
-3	3.5789**	2.9006	0.0158
-2	4.0118**	2.8564	0.0171
-1	4.3764**	2.9305	0.015
0	4.6619***	3.2367	0.0089
1	5.0105***	3.4768	0.006
2	5.3421***	3.7761	0.0036
3	5.5902***	3.9182	0.0029
4	5.8431***	4.2428	0.0017
5	6.1838***	4.6269	0.0009
6	6.3801***	4.6033	0.001
7	6.7420***	4.6835	0.0009
8	6.9829***	4.6078	0.001
9	7.2764***	4.6355	0.0009
10	7.7122***	4.6839	0.0009
11	7.9435***	4.948	0.0006
12	8.4338***	5.2087	0.0004
13	8.9599***	4.8657	0.0007
14	9.3010***	4.9114	0.0006
15	9.5630***	5.3917	0.0003

6.2 Robustness Test

In the robustness test, we examine whether the positive announcement effect on China Construction Bank's stock price remains robust when we change the event study window. As shown in Table 6, when the event study window is set to [-5,5], there is 1 day with a negative ARR and 4 days with a positive ARR in the 5 days before the announcement, but none of them are statistically significant. In the 5 days after the announcement, there is 1 day with a negative ARR and 4 days with a positive ARR, but again, none of them are statistically significant. This indicates that there is no significant ARR for China Construction Bank's stock price before the announcement, and there is no significant ARR in the 5 days immediately after the announcement. This finding is consistent with the significant positive ARR that starts to appear from the 6th day after the announcement when the event study window is set to [-15,15].

Table 6 AAR in [-5,5] event windows

Date	ARR (%)	T-Statistic	Prob.
-5	-0.1631	-0.6004	0.5631
-4	0.2072	0.4763	0.6452
-3	0.5366	1.6772	0.1278
-2	0.2460	0.6801	0.5135
-1	0.6878	1.4435	0.1828
0	0.0965	0.3013	0.7700
1	0.3598	1.1990	0.2611
2	0.2157	1.4582	0.1788
3	0.3177	1.4938	0.1694
4	-0.0912	-0.179	0.8619
5	0.3087	1.4264	0.1875

As shown in Table 7, when the event study window is set to [-20,20], in the 20 days before the announcement, there are 4 days with a negative ARR and 16 days with a positive ARR, out of which 5 days are statistically significant. In the 20 days after the announcement, there is 1 day with a negative ARR and 19 days with a positive ARR, out of which 8 days are statistically significant. These findings are consistent with the conclusion that the announcement effect is positive and the number of days with significant ARR increases after the announcement when the event study window is set to [-15,15]. Furthermore, the significant ARR is concentrated after the 6th day following the announcement, which is also consistent with the findings when the event study window is set to [-15,15]. This indicates that the empirical results of this study are relatively robust.

Table 7 AAR in [-20,20] event windows

Date	ARR (%)	T-Statistic	Prob.				
				0	0.1775	0.8919	0.3934
-20	0.7890*	2.1684	0.0553	1	0.3740	1.3256	0.2145
-19	-0.0757	-0.4327	0.6744	2	0.3093*	1.9536	0.0793
-18	0.3992**	3.163	0.0101	3	0.3384	1.5791	0.1454
-17	0.5695*	2.1121	0.0608	4	0.1470	0.687	0.5077
-16	0.4291	1.7228	0.1156	5	0.3483	1.7516	0.1104
-15	0.4520	1.6147	0.1374	6	0.3172*	1.9548	0.0791
-14	0.4525	1.3563	0.2048	7	0.0631	0.4606	0.6550
-13	0.0250	0.0903	0.9298	8	0.6392*	2.0765	0.0646
-12	0.0920	0.2675	0.7945	9	-0.1761	-0.6515	0.5294
-11	0.8214*	1.983	0.0755	10	0.7622***	3.5446	0.0053
-10	-0.0528	-0.2158	0.8335	11	0.1061	0.561	0.5871
-9	0.4390	1.4692	0.1725	12	0.3382**	2.2296	0.0499
-8	-0.0529	-0.2755	0.7885	13	0.6330*	1.843	0.0951
-7	0.1528	0.6704	0.5178	14	0.4129	1.6744	0.125
-6	0.6592**	2.6783	0.0232	15	0.2585	0.7198	0.4881

-5	-0.0265	-0.0868	0.9325	16	0.9737**	3.1103	0.0111
-4	0.0852	0.2586	0.8012	17	0.4583*	1.8836	0.089
-3	0.4994	1.5175	0.1601	18	0.2919	0.7104	0.4937
-2	0.3144	1.2318	0.2462	19	0.4800	1.3431	0.2089
-1	0.5371	1.3113	0.2191	20	0.0177	0.0419	0.9674

7. Research Recommendations

In conclusion, this study examines the announcement effect of China Construction Bank's issuance of tier 2 capital bonds through empirical analysis. The research findings indicate the following:

Firstly, the announcement of tier 2 capital bond issuance has a positive impact on China Construction Bank's stock price, as evidenced by the positive abnormal returns during the event study window. This can be attributed to the lower cost of capital for China Construction Bank's issuance of tier 2 capital bonds, indicating its good operational and credit conditions, which sends a positive signal to investors. Additionally, according to the tax-adjusted MM theorem, the issuance of tier 2 capital bonds by China Construction Bank can generate tax shield effects, increasing the company's value. Moreover, the presence of write-down clauses in tier 2 capital bonds allows China Construction Bank to reduce the bonds' value in times of financial crisis, thereby avoiding the exacerbation of financial distress costs.

Secondly, the significant levels of abnormal returns are higher during the 6th to 14th day after the announcement, indicating that the positive announcement effect occurs approximately one week after the announcement and lasts for one week. This could be attributed to investors' limited attention, as they may not promptly focus on the latest information regarding China Construction Bank, thereby prolonging the time it takes for information to be reflected in stock prices. Furthermore, it suggests that the efficiency of China's capital market is still insufficient, as prices may not promptly incorporate new information.

Based on the above conclusions, the following policy recommendations are proposed:

For China Construction Bank, the bank should consider tier 2 capital bonds as a primary tool for supplementing capital adequacy. By reducing the cost of capital, it can increase the bank's market value. Moreover, the bank should carefully select the timing of issuing tier 2 capital bonds and utilize them to boost the stock price during periods of low performance.

For regulatory authorities, it is recommended to strengthen oversight and preparedness for market liquidity to mitigate excessive speculative fluctuations caused by China Construction Bank's issuance of tier 2 capital bonds. Measures should be taken to prevent large-scale buying or selling by institutions that may lead to market volatility. Additionally, regulatory authorities should enhance supervision over major shareholders and relevant institutional investors to prevent insider trading. Furthermore, efforts should be made to promote financial market reforms and improve the efficiency of resource allocation in the capital market.

For investors in China Construction Bank, short-term investors can consider buying after the announcement of tier 2 capital bond issuance and selling around the 14th day after the announcement to capture excess returns.

It is important to note that these conclusions and policy recommendations are based on the specific context of the study and should be considered in conjunction with other factors and assessments when making investment decisions or formulating policies.

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