



**中信期货有限公司**  
CITIC Futures Company Limited

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CSRC License [2012] No. 669**

**投资咨询业务资格：证监许可【2012】669号**

# 中国国债期货

# China Government Bond Futures

## 基础介绍 Introduction

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## 1. 期货合约 Introduction

## 2. 套保策略 Hedging Strategies

## 3. 套利策略 Arbitrage Strategies

# Futures contract comparison 期货合约比较

	T	TF	TS	TL
<b>Underlying product quality</b> 合约标的	Nominal long term treasury bond with face value of 1 million RMB and a coupon rate of 3%	Nominal medium term treasury bond with face value of 1 million RMB and a coupon rate of 3%	Nominal medium and short-term treasury bond with face value of 2 million RMB and a coupon rate of 3%	Nominal ultra-long-term treasury bond with face value of 1 million RMB and a coupon rate of 3%
<b>Deliverable Treasury Bonds</b> 可交割国债	Book-entry interest-bearing treasury bonds with an issuance period not exceeding 10 years and a remaining term not less than 6.5 years on the first day of the contract expiration month	Book-entry interest-bearing treasury bonds with an issuance period not exceeding 5.25 years and a remaining term not less than 4 years on the first day of the contract expiration month	Book-entry interest-bearing treasury bonds with an issuance period not exceeding 2.25 years and a remaining term not less than 1.5 years on the first day of the contract expiration month	Book-entry interest-bearing treasury bonds with an issuance period not exceeding 30 years and a remaining term not less than 25 years on the first day of the contract expiration month
<b>Price Quotation</b> 报价方式	Net Price of 100RMB			
<b>Minimum Price Fluctuation</b> 最小变动价位	0.005 RMB		0.002RMB	0.01RMB
<b>Maximum Price Fluctuation</b> 最大波动限制	2% of the contract value	1.2% of the contract value	0.5% of the contract value	3.5% of the contract value
<b>Minimum Trading Margin</b> 最低交易保证金	2% of the contract value	1% of the contract value	0.5% of the contract value	3.5% of the contract value

Sources: CFFEX, CITIC Futures

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# Futures contract comparison 期货合约比较



	T	TF	TS	TL
<b>Underlying product quality</b>	面值为100万元人民币、票面利率为3%的名义长期国债	面值为100万元人民币、票面利率为3%的名义长期国债	面值为200万元人民币、票面利率为3%的名义长期国债	面值为100万元人民币、票面利率为3%的名义长期国债
<b>Deliverable Treasury Bonds</b>	发行期限不高于10年、合约到期月份首日剩余期限不低于6.5年的记账式付息国债	发行期限不高于7年、合约到期月份首日剩余期限为4-5.25年的记账式付息国债	发行期限不高于5年、合约到期月份首日剩余期限为1.5-2.25年的记账式付息国债	发行期限不高于30年、合约到期月份首日剩余期限不低于25年的记账式付息国债
<b>Price Quotation</b>	百元净价报价			
<b>Minimum Price Fluctuation</b>	0.005 RMB		0.002RMB	0.01RMB
<b>Maximum Price Fluctuation</b>	合约价值的2%	合约价值的1.2%	合约价值的0.5%	合约价值的3.5%
<b>Minimum Trading Margin</b>	合约价值的2%	合约价值的1%	合约价值的0.5%	合约价值的3.5%

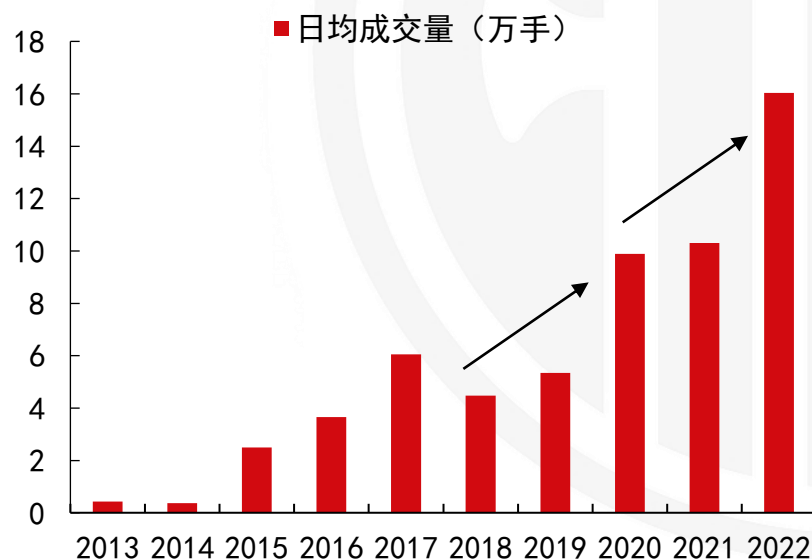
Sources: CFFEX, CITIC Futures

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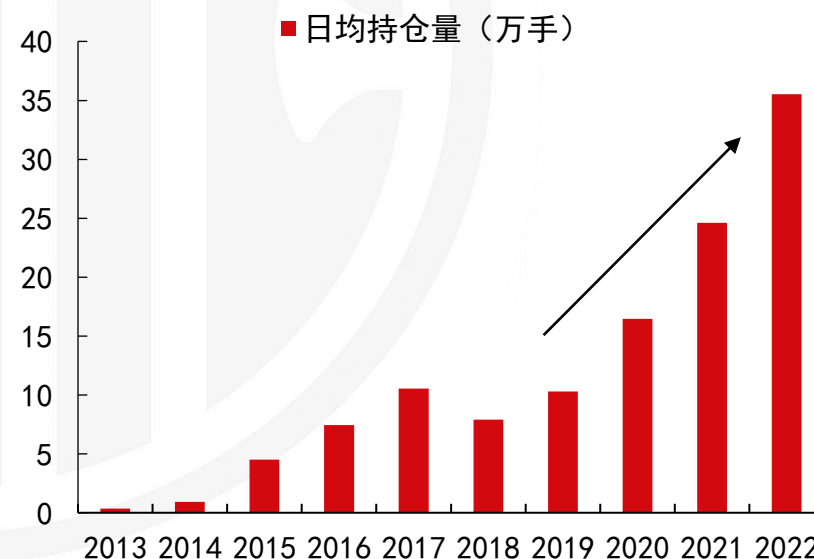
# 市场概况 Market Overview

- **The overall scale of the treasury futures market continues to rise.** In 2022, the average daily trading volume of treasury futures was 160,400 contracts, with an average daily trading amount of approximately 191.8 billion RMB. The average daily open interest was 355,200 contracts, with an average daily open interest amount of approximately 412.9 billion yuan.
- 随着品种和参与度的提升，国债期货市场规模整体上不断上升。2022年，国债期货日均成交量16.04万手，日均成交金额约1918亿元；日均持仓量35.52万手，日均持仓金额约4129亿元。

国债期货日均成交量 Daily average volume (10,000lots)



国债期货日均持仓量 Daily average OI (10,000lots)



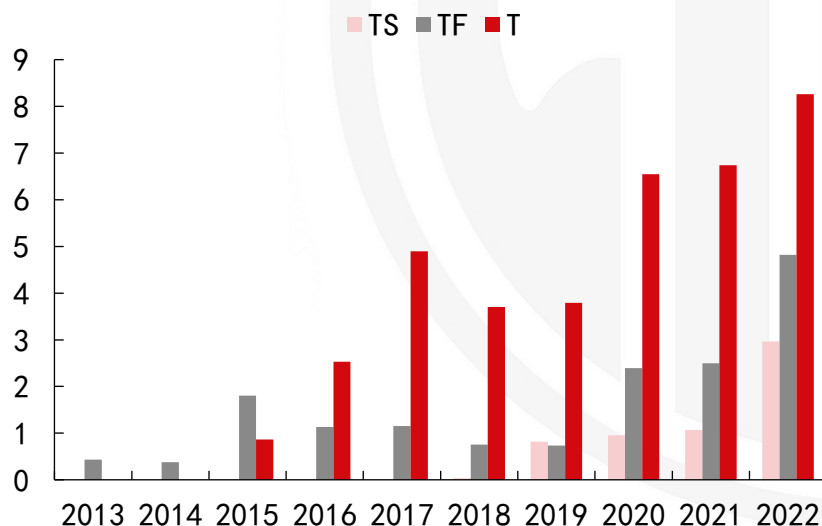
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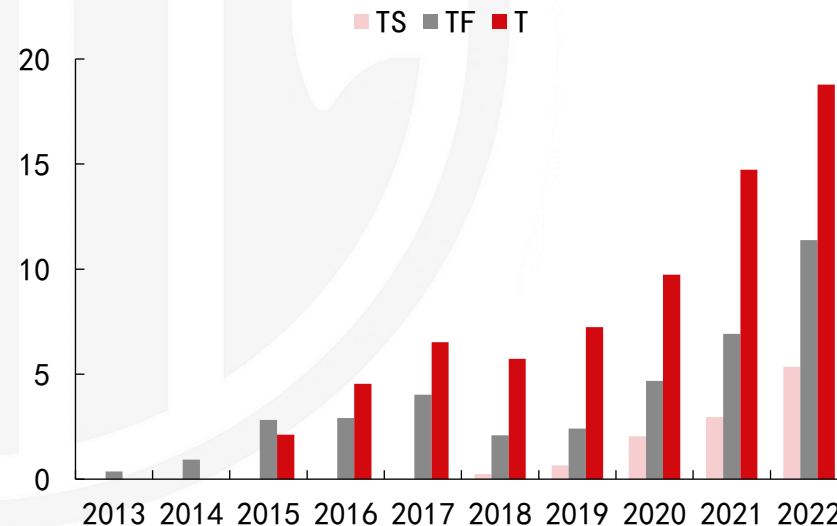
# 市场概况 Market Overview

- **10-year treasury futures has the highest trading volume.** In 2022, the average daily trading volume of treasury futures was 160,400 contracts, of which T/TF/TS contracts were 82,600/48,200/29,600 contracts. In 2022, the average daily open interest of treasury futures was 355,200 contracts, of which T/TF/TS were 187,900/113,800/53,600 contracts.
- **不同品种的交易需求略有差异，其中10年期国债期货流动性优势明显。** 2022年，国债期货日均成交量16.04万手，其中T/TF/TS合约日均成交量8.26/4.82/2.96万手。2022年，国债期货日均持仓量35.52万手，其中T/TF/TS合约日均持仓量18.79/11.38/5.36万手。

国债期货日均成交量 Daily average volume (10,000lots)



国债期货日均持仓量 Daily average OI (10,000lots)



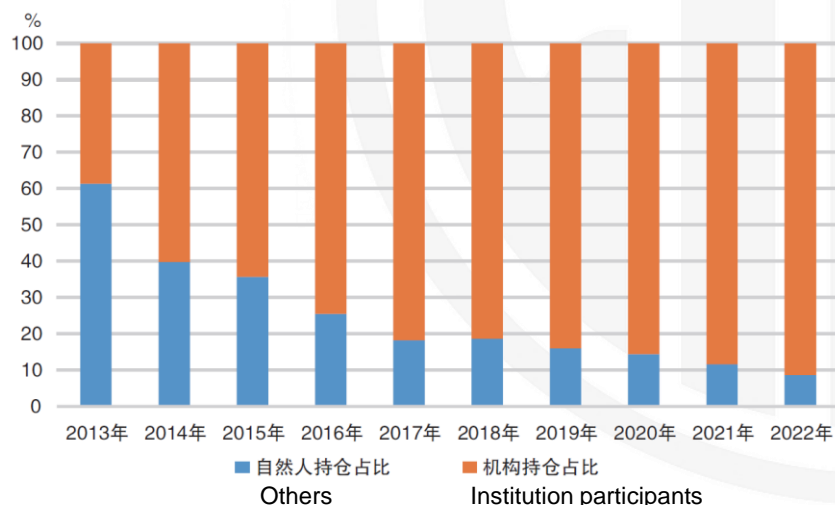
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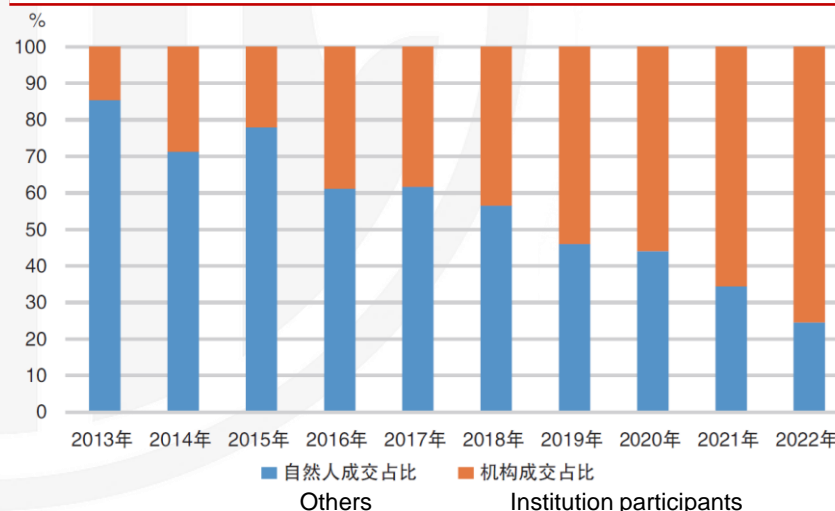
# 投资者类型 Investor Types

- In 2020/2021/2022, the proportion of treasury futures held by institutional investors were 85.63%/88.40%/91.39%, and accounted for 55.95%/65.55%/75.47% of the transactions. Securities companies and private equity funds have a high level of participation, while commercial banks, insurance funds, public funds, and other medium and long-term funds are not fully utilizing financial futures.
- 2020/2021/2022年，机构投资者在国债期货上的持仓占比已上升到85.63%/88.40%/91.39%，成交占比55.95%/65.55%/75.47%。证券公司、私募基金参与度较高，商业银行及保险资金、公募基金等中长期资金运用金融期货还不充分。

国债期货持仓结构 OI Structure (%)



国债期货成交结构 Trading volume Structures (%)



Sources: CFFEX, CITIC Futures

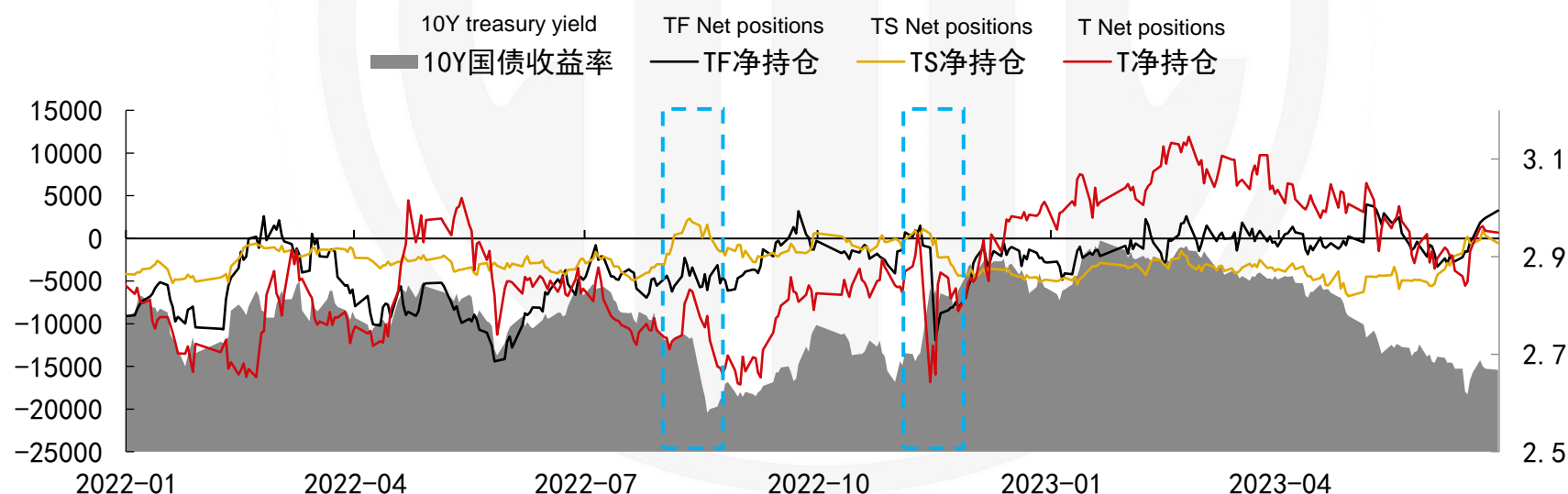
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# 投资者类型 Investor Types

- Banks, insurance companies, and other financial institutions have been increasingly using government bond futures as hedging tools. During the bond market adjustment in 2022, the net position (long-short) of government bond futures significantly decreased. On November 14, 2022, the net position of the T contract reached -16,857, a sharp decrease of more than 10,000 lots compared to the previous day. This shows that government bond futures have served as a tool for hedging against interest rate risk.

银行保险等对国债期货参与度不断提升，并将国债期货作为其套保工具。2022年债市调整阶段，国债期货净持仓（多单-空单）大幅下行。2022年11月14日，国债期货T合约净持仓达到-16857手，相比于前一日（-5285手）大幅下降超过1万手，国债期货充当了对冲利率风险的工具。

**国债期货在债市调整时充当了对冲利率风险的工具 CGB Futures act as tools to hedge against interest rate risk**



Sources: CFFEX, CITIC Futures

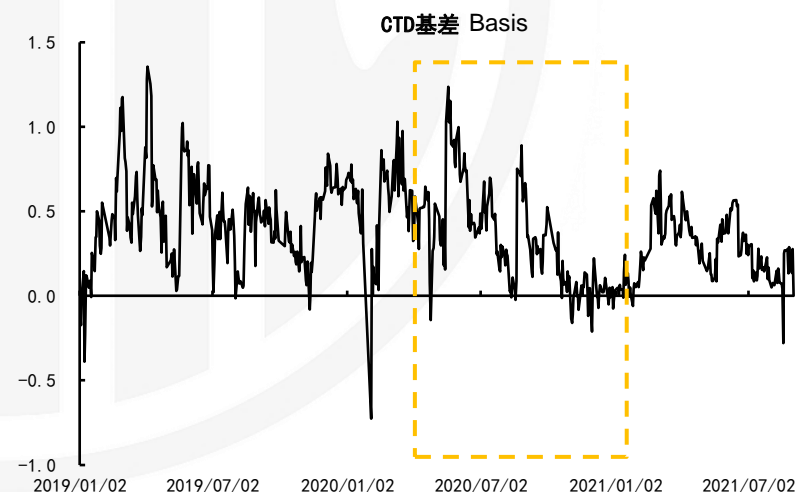
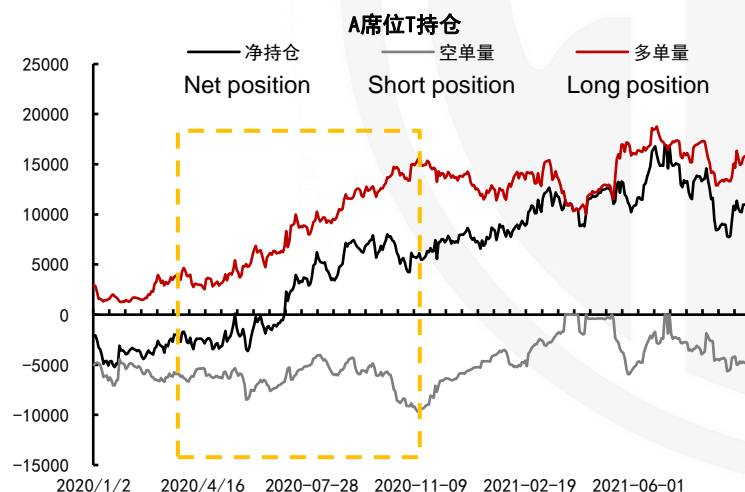
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# 投资者类型 Investor Types

- Macro hedge funds and other private equity firms primarily adopt alternative strategies, focusing on the convergence of basis returns. The primary position is long, acting as a counterparty to traditional hedging positions. Additionally, quantitative seats, which lean towards non-subjective logic, act as counterparts to traditional traders, enhancing market activity.
- 宏观对冲等私募机构策略以替代思路为主，关注基差收敛收益；国债期货层面以多头持仓为主，与传统对冲头寸形成对手方，推升总持仓水平。另外如量化席位，偏非主观逻辑，与传统交易者形成对手方，推升市场活跃度。

某典型宏观对冲策略席位数据显示，2020年Q2-Q3该策略积极介入 An example of Hedge fund strategy in 2020



Sources: CFFEX, CITIC Futures

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## ■ 名义标的 Nominal Underlying

- The underlying asset of a government bond futures contract is not a specific bond, instead, a “nominal standard bond” that does not actually exist is used.

国债期货合约标的非特定的某只债券，而是采用**并不存在的“名义标准券”**作为交易标的。

## ■ 实际标的 Actual Underlying

- A basket of deliverable government bonds. Multiple types of bonds are used for the actual delivery of government bond futures.

一篮子可交割国债，国债期货实际交割采用**多券种替代交收**。

## ■ 设计意义 Significance of Design

- It can effectively prevent price manipulation that might occur due to a small issuance size of the corresponding bonds, a too small spot market, or insufficient liquidity.

这样的设计可以避免由于相应债券发行数量较小、现货市场规模过小、可流动数量不足而出现的价格操纵。

# 交易规则 Trading Rules

## 交割月份

- 采用3、6、9、12季月循环中最近的3个季月，符合国际惯例，也可以避开春节、十一等长假。

## 交易日设定

- 最后交易日为季月的第二个周五，因金融机构在季末和下旬面临监管考核及资金压力。

## 交易时间

- 上午9:30~11:30，下午13:00~15:15，覆盖交易所和银行间市场的活跃交易时段。
- 最后交易日只有上午交易，符合国际惯例，同时便于卖方准备券进行交割，减少违约风险。

## 交易费用

- 平今仓手续费：0
- 交易手续费：3元/手
- 交割手续费：5元/手（2023年1月1日起至2023年12月31日止，减半收取）

## 结算价

- 合约最后一小时成交价格按照成交量的加权平均价。计算结果保留至小数点后三位。

# 交易规则 Trading Rules

## Delivery months

- Adopting the nearest three quarterly months in the 3, 6, 9, 12-month cycle is in line with international conventions and can also avoid long holidays such as the Spring Festival and National Day.

## Set of trading days

- The last trading day is the second Friday of the quarter month, due to the regulatory assessments and financial pressures faced by financial institutions at the end of the quarter and in the latter part of the month.

## Trading time

- The active trading hours are from 9:30 to 11:30 in the morning and from 13:00 to 15:15 in the afternoon, covering the active trading periods of both the exchange and the interbank market.
- On the last trading day, trading only takes place in the morning. This is in line with international conventions and also facilitates the preparation of bonds for delivery by the seller, reducing the risk of default.

## Trading fees

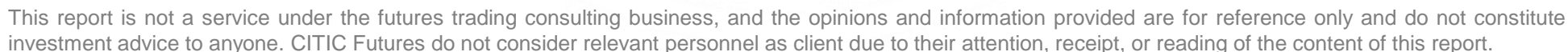
- Intraday position handling fee: 0
- Transaction fee: 3 RMB per contract
- Delivery fee: 5 RMB per contract (From 1/1/2023, to 12/31/2023, the fee will be reduced by half)

## Settlement price

- The transaction price in the last hour of the contract is calculated according to the Volume Weighted Average Price. The calculation result is retained to three decimal places.

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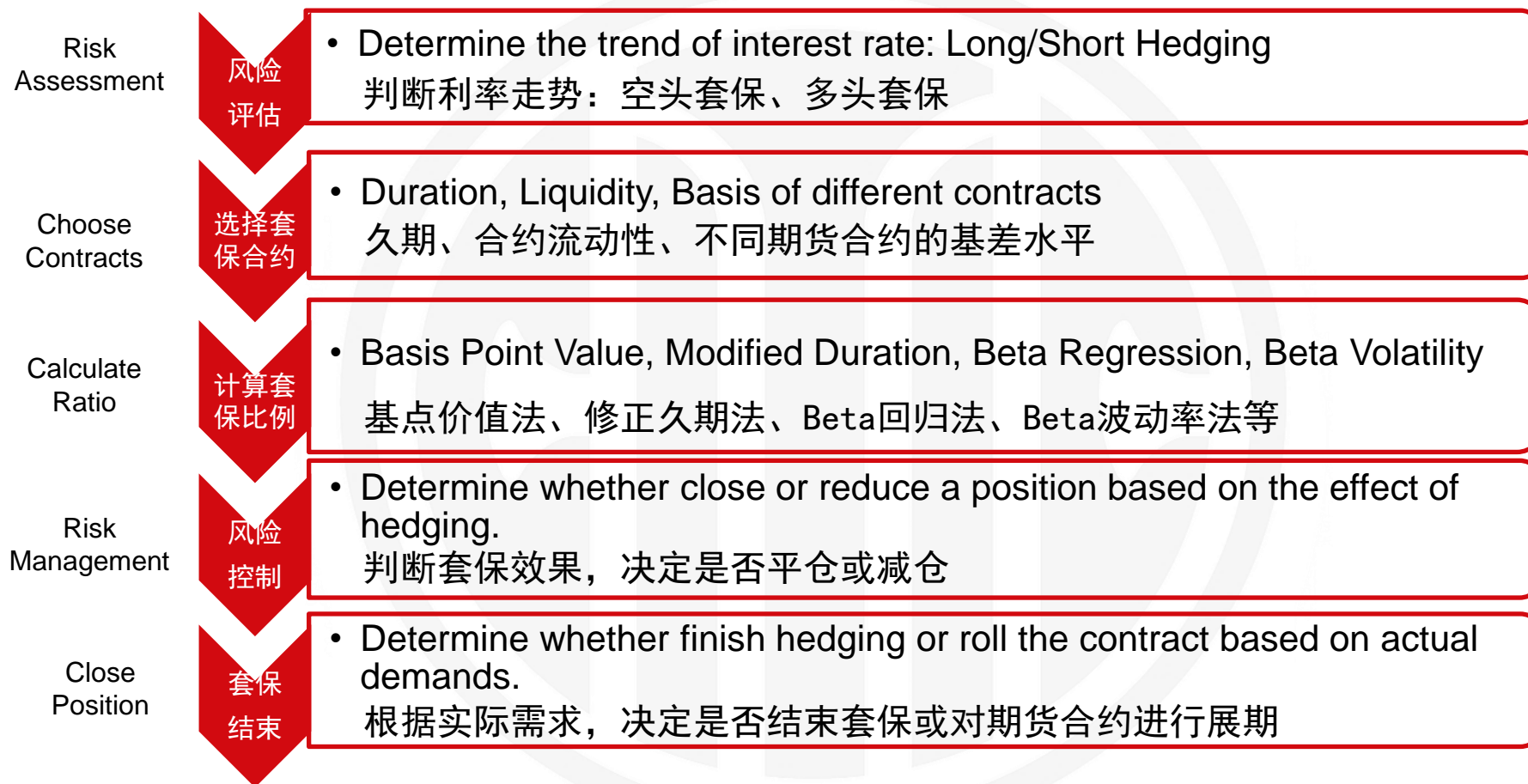


## 1. 期货合约 Introduction

## 2. 套保策略 Hedging Strategies

## 3. 套利策略 Arbitrage Strategies

# 国债期货套保 Hedging of Treasury Futures



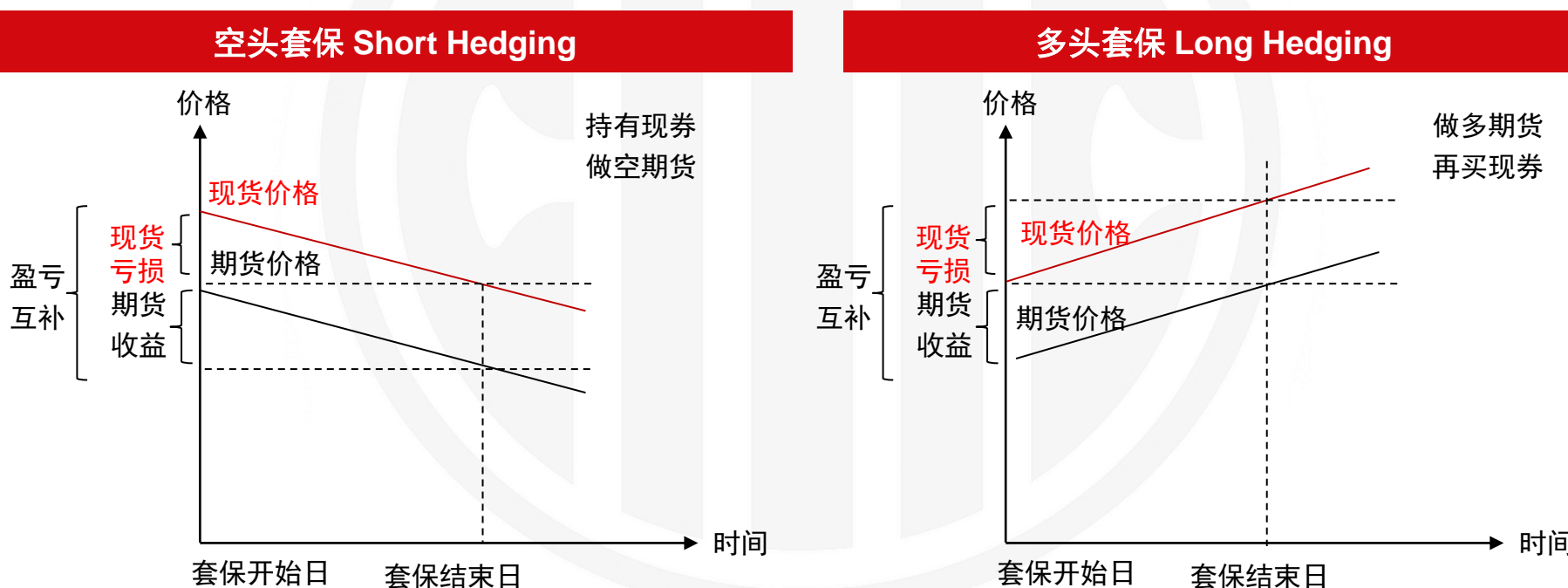
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# 套期保值基本原理 Basic Principles of Hedging

- The linkage between futures and spot prices is the basis of treasury futures hedging. By simultaneously constructing positions in opposite directions in both futures and spot markets, the losses in the spot market can be compensated by the futures market. Essentially, it is a "profit and loss complementation" mechanism.

期、现货价格联动是国债期货套保功能的基础。通过同时在期现两端反向构建头寸，达到现货端的亏损可以由期货端弥补的效果。本质上是一种“盈亏互补”机制。



Source: CITIC Futures

Sources: CFFEX, CITIC Futures

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## 套期保值基本原理 Basic Principles of Hedging

- The hedging ratio refers to the ratio of the price change of a bond portfolio to the price change of a single futures contract. Since bonds have different sensitivities to interest rate changes, when using treasury futures to hedge, the relationship between the value of the spot and the required treasury futures contract is not 1:1.

套保比例是指债券现货组合价格变动与一张期货合约价格变动的比例。由于各种债券对利率变动的敏感程度不相同，在运用国债期货进行套期保值时，现货的价值与所需国债期货合约的价值之间并不是1:1的关系

- Under perfect hedging, the loss on spot price due to interest rate changes should be exactly offset by the profits from futures positions.

在完美套期保值下，由于利率波动引起的现货价格波动的损失应正好被期货头寸的盈利冲抵

$$\Delta B = \Delta F * K$$

- Since futures prices follow the fluctuations of the Cheapest to Deliver (CTD) price,  $\Delta CTD$  is generally used to estimate  $\Delta F$

由于期货价格跟随CTD价格波动，一般用  $\Delta CTD$  来估算  $\Delta F$

## 计算套保比例：简单方法

## Calculate Hedge Ratio : Simple methods

- Simple methods imply the assumption that the change in spot yield equals to the change in futures yield. It is only suitable for hedging the same term spot, or the yield curve shows parallel changes.

简单方法隐含了现货收益率变动和期货收益率变动相等的假设。仅适合对相同期限的现货进行套保，或者收益率曲线呈平行变动的情况。

### 基点价值方法 Basis Value Method:

$$\text{HedgeNum} = \frac{\text{Basis Value of bond portfolio}}{\text{Basis Value of CTD}} \times \text{Conversion Factor of CTD}$$

$$\text{基点价值法套保手数} = \frac{\text{债券组合基点价值}}{\text{CTD基点价值}} \times \text{CTD转换因子}$$

### 修正久期方法 Modified Duration Method:

$$\text{HedgeNum} = \frac{\text{Modified Duration of bond portfolio} \times \text{Value of bond portfolio}}{\text{Modified Duration of CTD} \times \text{Value of futures contracts}}$$

$$\text{修正久期法套保手数} = \frac{\text{债券组合修正久期} \times \text{债券组合价值}}{\text{CTD修正久期} \times \text{期货合约价值}}$$

## 计算套保比例：Beta调整方法

## Calculate Hedge Ratio：Beta Adjustment Method

- Suitable for situations of term mismatch and non-parallel changes in the yield curve.

Beta调整方法适用期限不匹配以及收益率曲线非平行变动的情况。

### Beta回归法 Beta Regression Method:

$$\Delta y_{BOND} = a + b \times \Delta y_{CTD}$$

$$\text{HedgeNum} = \frac{\text{Modified Duration of bond portfolio} \times \text{Value of bond portfolio}}{\text{Modified Duration of CTD} \times \text{Value of futures contracts}} \times b$$

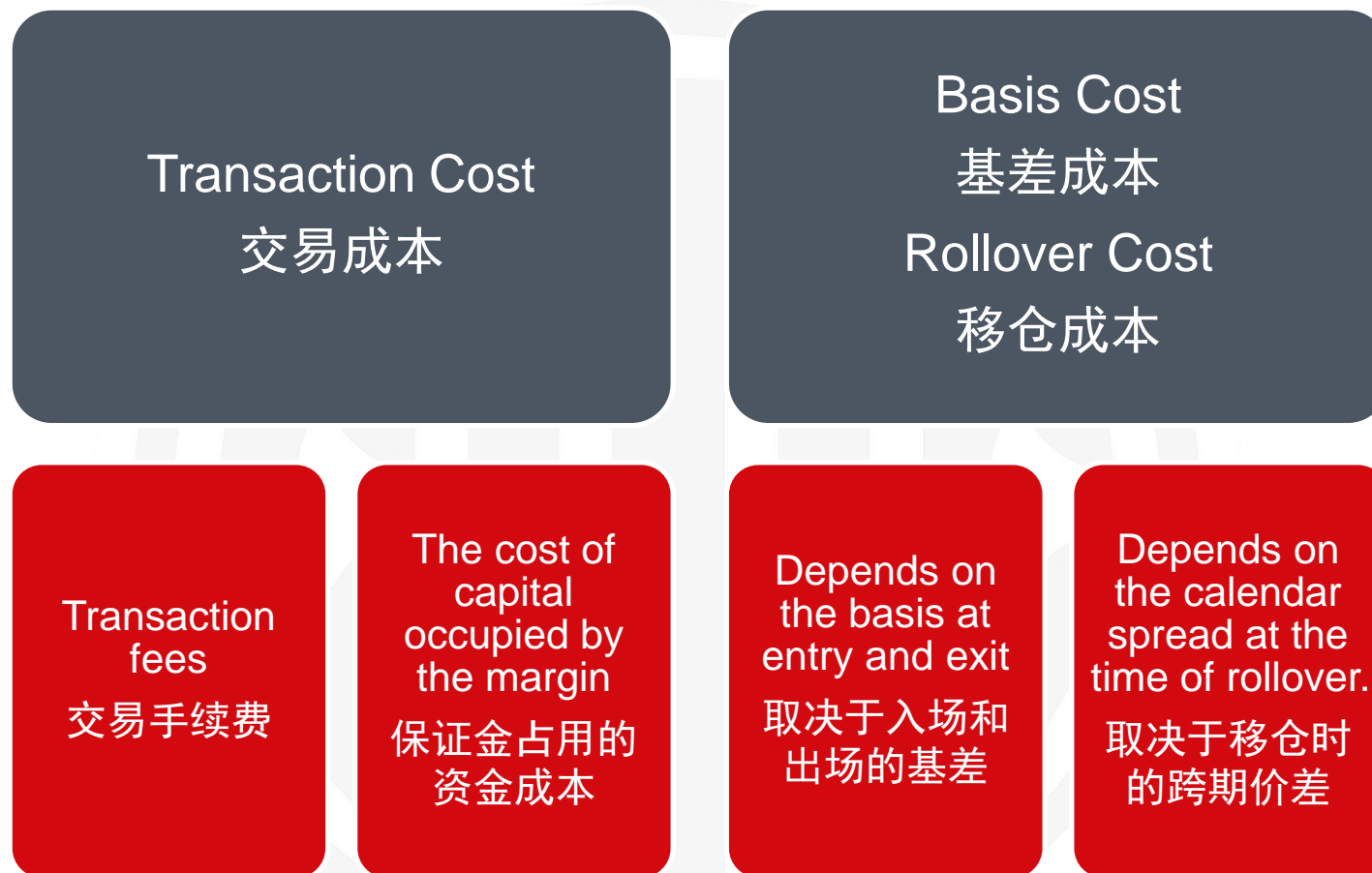
$$\text{套期保值手数} = \frac{\text{债券组合修正久期} \times \text{债券组合价值}}{\text{CTD修正久期} \times \text{期货合约价值}} \times b$$

### Beta波动率法 Beta Volatility Method:

$$b^* = \frac{SD_{BOND}}{SD_{CTD}}$$

$$\text{HedgeNum} = \frac{\text{Modified Duration of bond portfolio} \times \text{Value of bond portfolio}}{\text{Modified Duration of CTD} \times \text{Value of futures contracts}} \times b^*$$

$$\text{套期保值手数} = \frac{\text{债券组合修正久期} \times \text{债券组合价值}}{\text{CTD修正久期} \times \text{期货合约价值}} \times b^*$$



## 1. 期货合约 Introduction

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- **Definition:** Buy a futures contract and sell spot bond corresponding to the government bond futures contract, in order to profit from the price difference between the futures and the spot.

在买入（或者卖出）某一国债期货合约的同时，卖出（或者买入）该国债期货合约对应的现券，以期利用期现间的价差变动来获利。

- $\text{Basis} = \text{Net Price of spot bond} - \text{Price of Futures} \times \text{Conversion Factor}$

基差=现货净价 - 期货价格×转换因子

## 做空基差 Short Basis

- 卖出现货 Sell spot bond
- 买入期货 Buy futures

## 做多基差 Long Basis

- 买入现货 Buy spot bond
- 卖出期货 Sell futures

## ■ The changes between the Implied Repo Rate (IRR) and the cost of capital

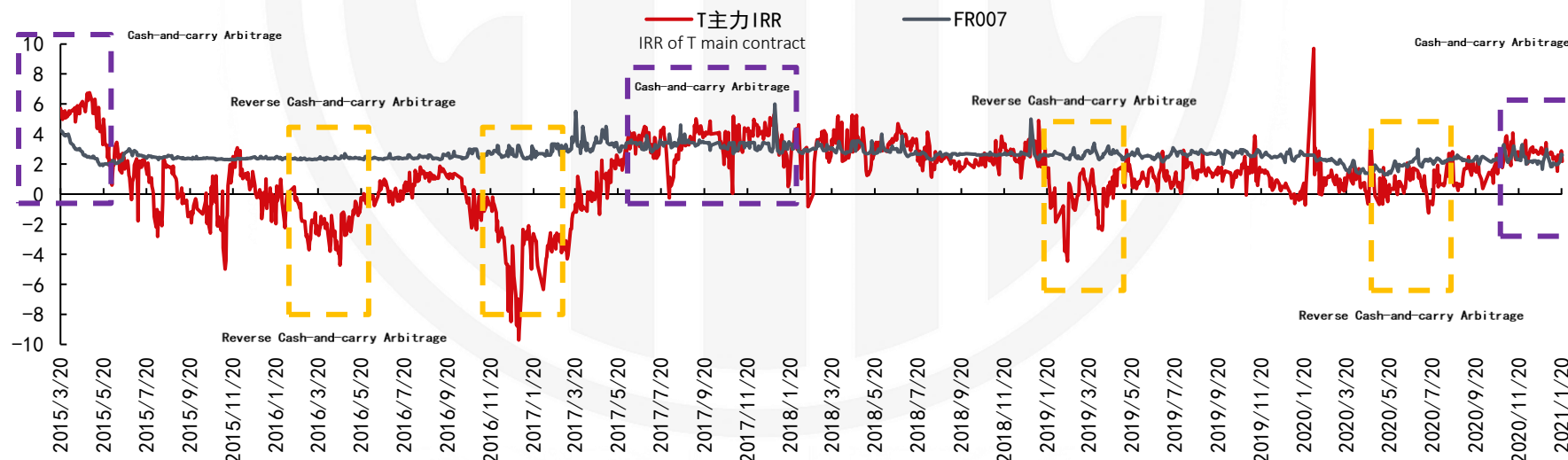
- **Cash-and-carry Arbitrage:** When the IRR is higher than the cost of capital, buy spot and sell futures; close the position when the prices of both return to normal levels, or hold until delivery to lock in profits.

当IRR高于资金成本时，买入现货，卖出期货；等待两者价格回到正常水平时平仓，或者持有至交割锁定收益

- **Reverse Cash-and-carry Arbitrage:** When the IRR is lower than the cost of capital, sell spot and buy futures; close the position when the prices of both return to normal levels, or hold until delivery to lock in profits.

当IRR低于资金成本时，买入期货，卖空现货；等待两者价格回到正常水平时平仓，或者持有至交割锁定收益。

### IRR与资金成本思路下的正反套机会 Examples of cash-and-carry Arbitrage



Sources: CFFEX, CITIC Futures

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# 基差套利 Basis Arbitrage

## ■ The changes in the value of delivery options

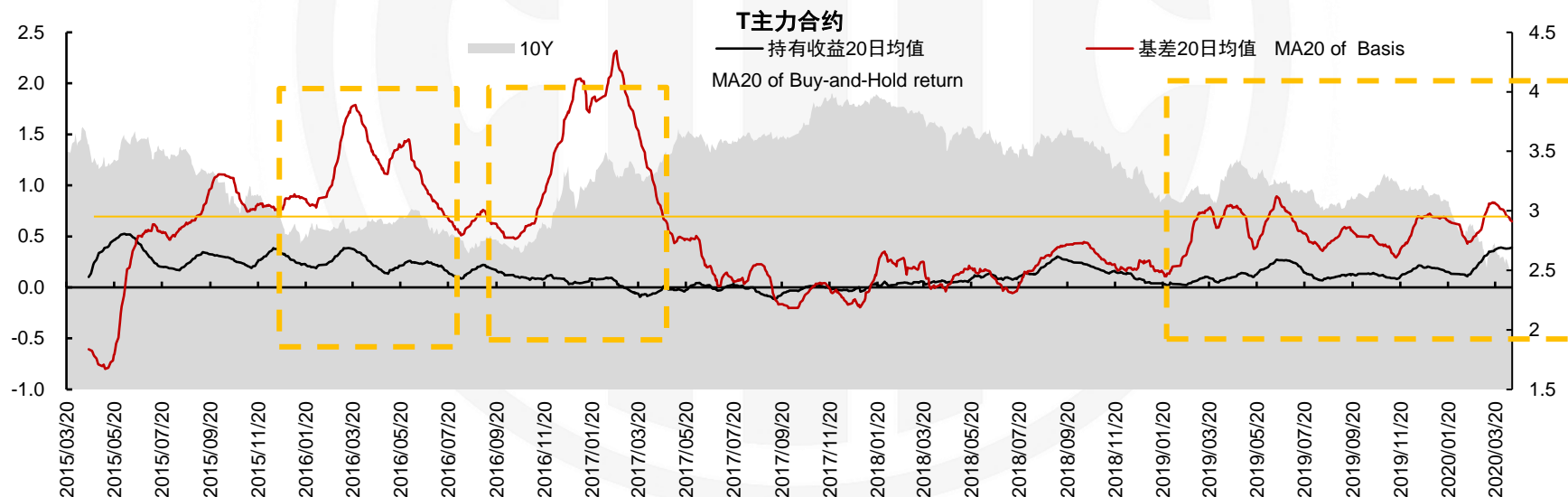
- **Cash-and-carry Arbitrage:** When the value of the delivery option increases, buy spot and sell futures; close the position when the prices of both return to normal levels.

当交割期权价值扩大时，买入现货，卖出期货；等待两者价格回到正常水平时平仓

- **Reverse Cash-and-carry Arbitrage:** When the value of the delivery option decreases, sell spot and buy futures; close the position when the prices of both return to normal levels.

当交割期权价值缩小时，买入期货，卖空现货；等待两者价格回到正常水平时平仓

### Basis Arbitrage caused by the changes in the value of delivery options



Sources: CFFEX, CITIC Futures

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## 跨期套利 Calendar Spread Arbitrage

- **Definition:** Buy a futures contract and sell a different month contract of the same treasury futures, in order to profit from the price difference between them.

在买入（或者卖出）某一国债期货品种合约的同时，卖出（或者买入）该国债期货品种不同月份合约，以期利用两个品种间的价差变动来获利。

- $\text{Calendar Spread} = \text{Near Month Futures Price} - \text{Back Month Futures Price}$

跨期价差=近月期货价格-远月期货价格

### 做空跨期价差 Short Calendar Spread

- 卖出近月 Sell Near Month contract
- 买入远月 Buy Back Month contract

### 做多跨期价差 Long Calendar Spread

- 买入近月 Buy Near Month contract
- 卖出远月 Sell Back Month contract

- **Long Calendar Spread:** buy near month contracts and sell distant month contracts.

When the risk-free interest rate curve steepens, or short positions dominate rollover.

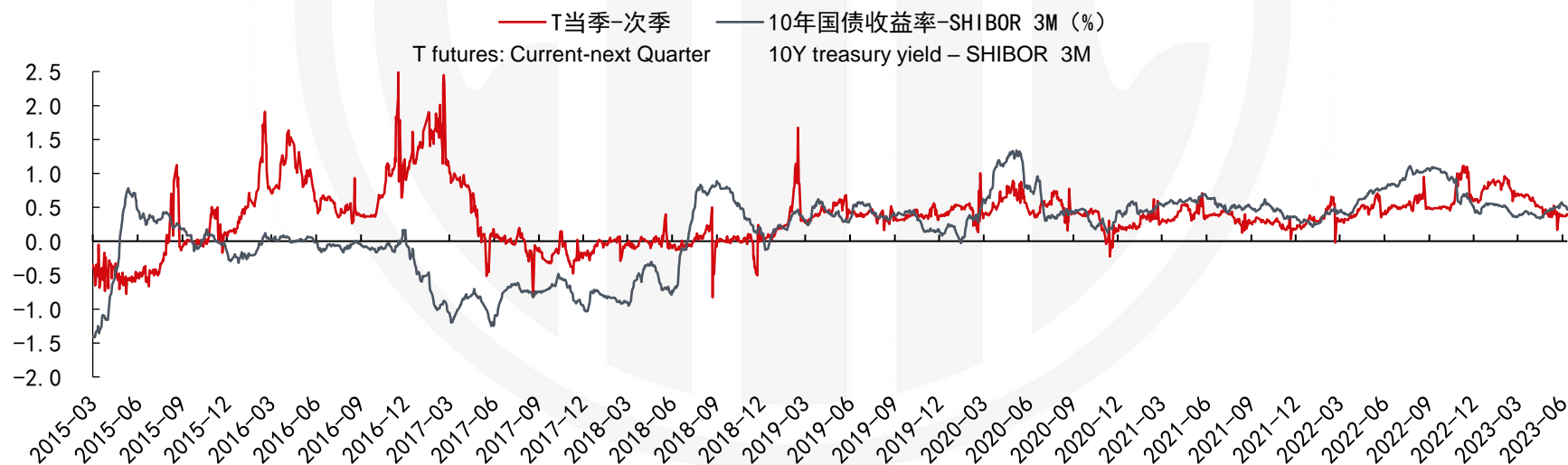
做多跨期价差：当无风险收益率曲线变陡时，或当空头主导移仓时，买入近月合约，卖出远月合约。

- **Short Calendar Spread:** sell near month contracts and buy distant month contracts.

When the risk-free interest rate curve flattens, or long positions dominate rollover.

做空跨期价差：当无风险收益率曲线变平时，或当多头主导移仓时，买入远月合约，卖出近月合约。

无风险收益率曲线陡平变动与跨期价差的互动关系



Sources: CFFEX, CITIC Futures

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- **Definition:** Buy (or sell) a contract of a certain type of treasury futures and sell (or buy) another type of treasury futures contract at the same time to profit from the price difference between the two types

买入（或者卖出）某一国债期货品种合约的同时，卖出（或者买入）另一个国债期货品种合约，以期利用两个品种间的价差变动来获利。

- **Driving Factor:** Changes in the steepness and flatness of the treasury bond yield curve  
驱动因素主要是国债收益率曲线的陡平变化

- Term spread widens and curve steepens--Cross-Species spread widen--Long Spread  
期限利差扩大，曲线走陡——跨品种价差扩大——做多跨品种价差
- Term spread narrows and curve flattens--Cross-Species spread flatten--Short Spread  
期限利差缩小，曲线走平——跨品种价差缩小——做空跨品种价差

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# Thanks

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