# Futures Markets and Central Counterparties

## Forward and Futures markets

- A **Forward contract** is an agreement to buy or sell an asset at a certain future time for a certain price.
- In contrast, spot transactions involve purchase or sale at the time of transaction.
- Forward contracts are negotiated between two parties and can be structured to suit the requirements of the two parties.
- The party that agrees to buy the asset has the **long position** and the party that agrees to sell has the **short position**.

- A **Futures contract** is also an agreement to buy or sell an asset at a certain future time for a certain price.
- However, futures contracts are standardized to allow trading on exchanges.
- Futures contracts trade on a wide variety of commodities and financial assets.
- Futures prices are regularly reported in the financial press.
- Futures markets are some of the most liquid derivative markets.

## Futures positions

- An investor’s exposure to futures price starts when the investor takes a long position or a short position in the futures contract.
- An investor taking a long position agrees to buy the underlying asset at the futures price.
- An investor taking a short position agrees to sell the underlying asset at the futures price.
- A long investor gains while a short investor loses when futures price increases.
- A short investor gains while a long investor loses when futures price decreases.
- An investor’s exposure to futures price changes ends when
    - the investor takes an opposite position to close original position (short position to close long position, long position to close short position)
    - the contract matures with delivery of the underlying asset or cash settlement.

## Futures contract specification

- The contract specifies the asset that the long party agrees to buy and the short party agrees to sell.
    - For assets with different grades or qualities, the contract specifies what grades or qualities are acceptable for delivery.
    - When the contract allows for multiple grades, the party with the short position can choose the exact grade to deliver.
    - In some cases (for example, corn futures), the contract specifies how price is adjusted if the grade delivered is not the standard grade specified in the contract.
- The **size** of the contract is the amount of the asset to be delivered.
    - If it is too large, investors may not be able to choose the right exposure they want.
    - It is too small, they may need to transact in too many contracts and may incur large transaction costs.
- **Delivery arrangements** specify the place of delivery.
    - For example, ICE frozen orange juice futures contracts allow delivery in exchange's warehouses in Florida, New Jersey, or Delaware.
    - When multiple sites are allowed for delivery, the short party chooses the venue.
    - Sometimes the price is adjusted based on venue.

- The **delivery month** is specified in the contract.
    - At any time, contracts trade for the next few delivery months.
    - The contract also specifies the last day of trading and the days in the month during which a short party can provide notice of delivery.
    - Note that the short party does not decide which long party will receive the asset.
    - The exchange decides that, usually choosing the long party with the earliest long position.
    - Delivery can be costly, so most investors want to avoid that.
    - A long investor can avoid the risk of delivery by closing its position before the first day on which a notice of delivery can be provided.
- The contract also specifies how price will be **quoted**.
- It also specifies **price limits**, the daily price movement beyond which exchange may halt trading for the day.
    - These limits are intended to prevent excessive speculation but may also prevent trading when price movement is driven by fundamentals.

**Example 1: CME Group Gold Futures Contract Specification**

Gold Futures provide global price discovery and opportunities for portfolio diversification by presenting an alternative to gold bullion, coins, and mining stock investments. Gold also offers ongoing trading opportunities, as gold prices respond quickly to political and economic events.

| | | |
|---|---|---|
| CONTRACT UNIT | 100 troy ounces | |
| PRICE QUOTATION | U.S. dollars and cents per troy ounce | |
| TRADING HOURS | CME Globex: | Sunday - Friday 6:00 p.m. - 5:00 p.m. (5:00 p.m. - 4:00 p.m. /CT) with a 60-minute break each day beginning at 5:00 p.m. (4:00 p.m. CT)<br><br>TAS: Sun-Fri 6:00 p.m. - 1:30 p.m. ET (5:00 - 12:30 CT)<br><br>TAM:<br>Asia: Sun - Frid 6:00 p.m. ET - 3:30 p.m. China<br>London a.m.: Sun-Fri 6:00 p.m. ET - 10:32 a.m. London<br>London p.m.: Sun-Fri 6:00 p.m. ET - 3:02 p.m. London |
| | CME ClearPort: | Sunday - Friday 6:00 p.m. - 5:00 p.m. (5:00 p.m. - 4:00 p.m. /CT) with a 60-minute break each day beginning at 5:00 p.m. (4:00 p.m. CT) |
| MINIMUM PRICE FLUCTUATION | Outright: 0.10 per troy ounce = $10.00<br><br>TAS/TAM: Zero or +/- 10 ticks in the minimum tick increment of the outright | |
| PRODUCT CODE | CME Globex: GC<br>CME ClearPort: GC<br>Clearing: GC<br>TAS: GCT<br>TAM: GC7 | |
| LISTED CONTRACTS | Monthy contracts listed for 3 consecutive months, any Feb, Apr, Aug, Oct in the nearest 23 months and any Jun and Dec in the nearest 72 months | |

| | |
|---|---|
| SETTLEMENT METHOD | Deliverable |
| TERMINATION OF TRADING | Trading terminates at 12:30 p.m. CT on the third last business day of the contract month. |
| TRADE AT MARKER OR TRADE AT SETTLEMENT RULES | Trading at Settlement (TAS) is subject to the requirements of Rule 524.A. TAS trades off a "Base Price" of zero (equal to the daily settlement price) to create a differential versus the daily settlement price in the underlying futures contract month. The TAS clearing price equals the daily settlement price of the underlying futures contract month plus or minus the TAS transaction price.<br><br>Trading at Marker (TAM) is analogous to Trading at Settlement (TAS) wherein parties are permitted to trade at a differential to a not-yet-known price. TAM uses a marker price, whereas TAS uses the Exchange-determined daily settlement price for the underlying futures contract month. |
| SETTLEMENT PROCEDURES | Gold Settlement Procedures |
| POSITION LIMITS | COMEX Position Limits |
| EXCHANGE RULEBOOK | COMEX 113 |
| BLOCK MINIMUM | Block Minimum Thresholds |
| PRICE LIMIT OR CIRCUIT | Price Limits |
| VENDOR CODES | Quote Vendor Symbols Listing |
| DELIVERY PERIOD | Delivery may take place on any business day beginning on the first business day of the delivery month or any subsequent business day of the delivery month, but not later than the last business day of the current delivery month. |
| GRADE AND QUALITY | Gold delivered under this contract shall assay to a minimum of 995 fineness. |

## Example 2: CME Group Corn Futures Contract Specification

Corn is the most liquid and active market in grains, with 350,000 contracts traded per day on average and open interest peaking at 1.7 million.

| | | |
|---|---|---|
| CONTRACT UNIT | 5,000 bushels | |
| PRICE QUOTATION | U.S. cents per bushel | |
| TRADING HOURS | CME Globex: | Sunday – Friday, 7:00 p.m. – 7:45 a.m. CT and<br>Monday – Friday, 8:30 a.m. – 1:20 p.m. CT<br><br>TAS: Sunday - Friday 7:00 p.m. - 7:45 a.m. and Monday - Friday 8:30 a.m. - 1:15 p.m. CT |
| | CME ClearPort: | Sunday 5:00 p.m. - Friday 5:45 p.m. CT with no reporting Monday - Thursday from 5:45 p.m. – 6:00 p.m. CT |
| MINIMUM PRICE FLUCTUATION | 1/4 of one cent (0.0025) per bushel = $12.50<br>TAS: Zero or +/- 4 ticks in the minimum tick increment of the outright | |
| PRODUCT CODE | CME Globex: ZC<br>CME ClearPort: C<br>Clearing: C<br>TAS: ZCT | |
| LISTED CONTRACTS | 9 monthly contracts of Mar, May, Sep and 8 monthly contracts of Jul and Dec listed annually after the termination of trading in the December contract of the current year. | |
| SETTLEMENT METHOD | Deliverable | |
| TERMINATION OF TRADING | Trading terminates on the business day prior to the 15th day of the contract month. | |
| TRADE AT MARKER OR TRADE AT SETTLEMENT RULES | Trading at Settlement (TAS) is subject to the requirements of Rule 524.A. TAS trades off a "Base Price" of zero (equal to the daily settlement price) to create a differential versus the daily settlement price in the underlying futures contract month. The TAS clearing price equals the daily settlement price of the underlying futures contract month plus or minus the TAS transaction price. | |

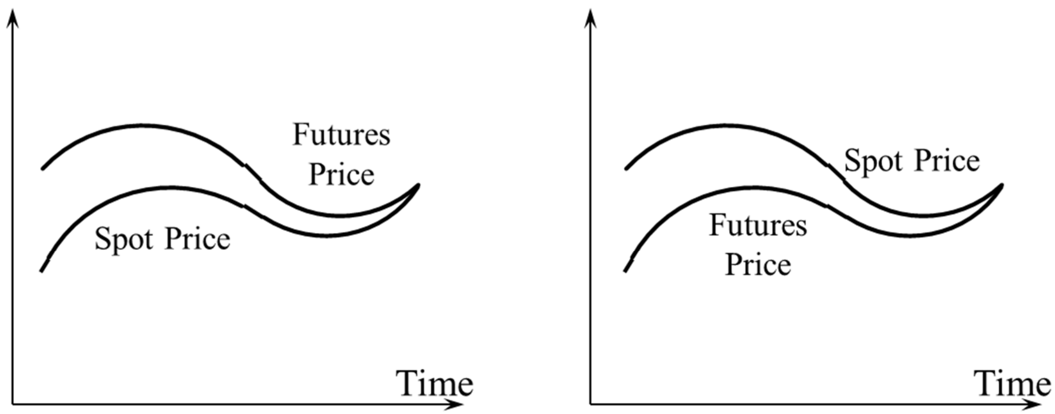
| | |
|---|---|
| SETTLEMENT PROCEDURES | Corn Settlement Procedures |
| POSITION LIMITS | CBOT Position Limits |
| EXCHANGE RULEBOOK | CBOT 10 |
| BLOCK MINIMUM | Block Minimum Thresholds |
| PRICE LIMIT OR CIRCUIT | Price Limits |
| VENDOR CODES | Quote Vendor Symbols Listing |
| LAST DELIVERY DATE | Second business day following the last trading day of the delivery month. |
| GRADE AND QUALITY | Through December 2018: #2 Yellow at contract Price, #1 Yellow at a 1.5 cent/bushel premium, #3 Yellow at a 1.5 cent/bushel discount. As of March 2019: #2 Yellow at contract Price, #1 Yellow at a 1.5 cent/bushel premium, #3 Yellow at a discount between 2 and 4 cents/bushel depending on broken corn and foreign material and damage grade factors. |

## Example 3: ICE Frozen Orange Juice Futures Contract Specification

| | |
|---|---|
| **Description** | The FCOJ-A futures contract is the world benchmark contract for the global frozen concentrated orange juice market. The contract prices physical delivery of U.S. Grade A juice (with grading performed by the U.S. Department of Agriculture), in storage in exchange licensed warehouse in several U.S. delivery points. Allowed countries of origin are the U.S., Brazil, Costa Rica and Mexico. |
| **Trading Screen Product Name** | FCOJ-A Futures |
| **Trading Screen Hub Name** | NYCC |
| **Commodity Code** | OJ |
| **Contract Size** | 15,000 pounds of orange juice solids (3% or less) |
| **Price Quotation** | Cents and hundredths of a cent to two decimal places |
| **Contract Series** | January, March, May, July, September, November. |
| **Minimum Price Fluctuation** | 5/100 of a cent per pound ( $7.50/contract / ) |
| **Settlement** | Physical delivery |
| **Grade/Standards/Quality** | US Grade A with a Brix value of not less than 62.5 degrees |
| **Daily Price Limit** | Ten cents per pound above/below the prior day settlement price. NOTE: this limit is subject to expansion under certain conditions, please see FCOJ Rule 13.08 |
| **Delivery Points** | Exchange licensed warehouses in Florida, New Jersey, and Delaware |
| **Deliverable Origins** | U.S., Brazil, Costa Rica and Mexico. |
| **First Notice Day** | First business day of contract month |
| **Last Trading Day** | 14th business day prior to the last business day of the month |
| **Last Notice Day** | Fifth business day prior to the last business day of the contract month |
| **Position Limit** | Position Limit and Position Accountability information for all IFUS products can be found here. |
| **MIC Code** | IFUS |
| **Clearing Venues** | ICUS |

## Convergence of Futures Price to Spot Price

The futures price converges to spot price as delivery period approaches. It is easy to see that if this did not happen, investors could earn arbitrage profits.



(a) (b)

## Margin Accounts

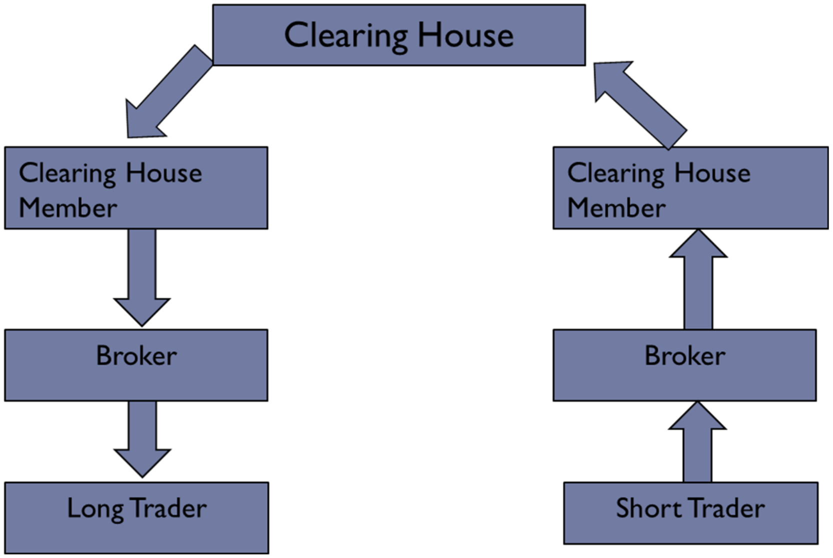
- Futures contracts obligate investors to buy or sell at futures price. Given the change in price, the long or the short party may regret entering into the contract. They may be tempted to either walk out of the contract. Or they may not be in a situation to honor their obligation.
- Either way, this introduces credit risk to a party with the opposite position.
- To prevent defaults, both long and short parties are required to maintain margin accounts with the exchange.
- The funds deposited in the account are intended to provide a cushion to the exchange clearing house to cover the losses of any party on its position.
- The balance in the margin account depletes when a party incurs losses and the balance increases when a party gains on its position.
- Investors must provide an **initial margin** when they first take a long or short position.
- Thereafter, the balance in the margin account is updated daily based on futures price movement. This is called **marking-to-market** or **daily settlement**.
- If the margin balance falls below a level called **maintenance margin**, the investor receives a **margin call** from the broker and must deposit funds to bring the margin balance to the initial margin level.
- If the investor does not provide funds, the broker can close the position.

- The brokers, in turn, maintain margin accounts with the **exchange clearing house**, either directly if they are members, or indirectly through a member of the exchange clearing house.
- However, there margin requirements are based on their **net position**, not **gross position**. For example, if one client of the broker is long five contracts whereas another is short three contracts, the broker's net position is long two contracts.
- Exchanges determine the level of initial margin and maintenance margin for their members. Brokers may have their own rules for their investors.
- The margin amounts may also vary based on the kind of investors and their portfolios (for example, day traders, long-term speculators, hedgers, etc.).
- The daily settlement ensures that credit risk is very low in exchange-traded futures markets. It also results in profits or losses in futures positions to be realized gradually as price changes rather than at delivery time.

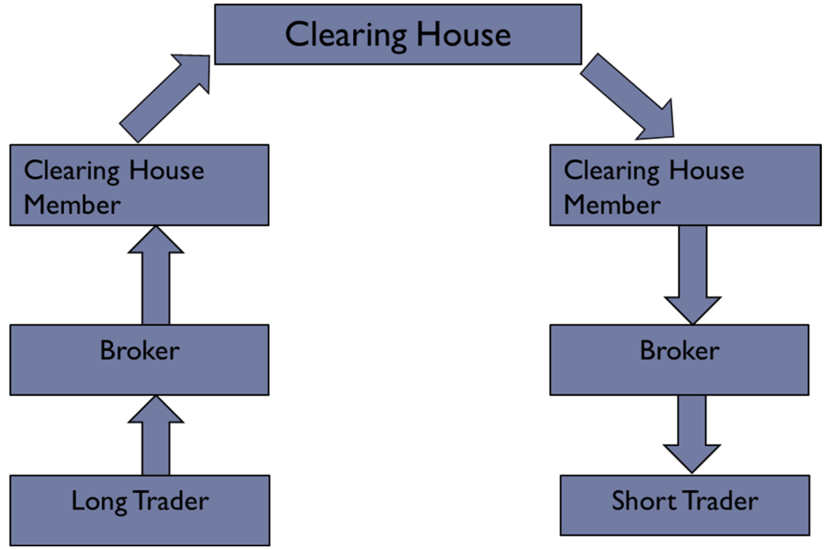
**Example 4**: An investor takes a long position in 2 December gold futures contracts on June 5. The contract size is 100 oz. The futures price is US$1250. The initial margin requirement is US$6,000/contract (US$12,000 in total). The maintenance margin is US$4,500/contract (US$9,000 in total). One possible outcome can be:

| Day | Trade Price ($) | Settle Price ($) | Daily Gain ($) | Cumulative Gain ($) | Margin Balance ($) | Margin Call ($) |
|---|---|---|---|---|---|---|
| 1 | 1,250.00 | | | | 12,000 | |
| 1 | | 1,241.00 | −1,800 | − 1,800 | 10,200 | |
| 2 | | 1,238.30 | −540 | −2,340 | 9,660 | |
| ….. | | ….. | ….. | ….. | …… | |
| 6 | | 1,236.20 | −780 | −2,760 | 9,240 | |
| 7 | | 1,229.90 | −1,260 | −4,020 | 7,980 | 4,020 |
| 8 | | 1,230.80 | 180 | −3,840 | 12,180 | |
| ….. | | ….. | ….. | ….. | …… | |
| 16 | 1,226.90 | | 780 | −4,620 | 15,180 | |

Margin Cash Flows When Futures Price Increases

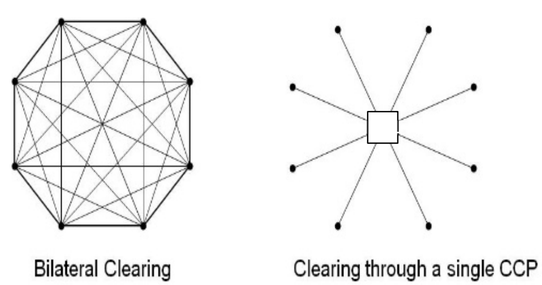



Margin Cash Flows When Futures Price Decreases



## Central Counterparties in OTC Markets

- OTC markets allow bilateral trading on negotiated contracts. However, OTC contracts also suffer from credit risk so they have developed margin procedures similar to those of exchange clearing houses.
- The margin accounts in OTC markets are maintained by **central counterparties**.
- A contract must be registered with a central counterparty for it to be able to enforce margin requirements. Alternatively, the two parties to an OTC contract can clear positions bilaterally.
- Usually, the parties enter into a master agreement covering all their trades. This agreement includes an annex called **credit support annex** that specifies the **collateral** that a party must provide to the other as price movements cause one party to gain and the other to lose.
- The collateral can be cash and in some cases can consist of securities. For the purpose of collateral, securities are valued at less than their market value, and the percent reduction in value is called the **haircut**.



## Some Terminology

- **Open interest** is the total number of contracts outstanding equal to number of long positions or number of short positions.
- The **settlement price** is the price just before the final bell each day used for the daily settlement process.
- The **volume of trading** is the number of trades in one day. Closing out a futures position involves entering into an offsetting trade. Most contracts are closed out before maturity.

## Questions

- When a new trade is completed what are the possible effects on the open interest?
- Can the volume of trading in a day be greater than the open interest?

## Delivery

- If a futures contract is not closed out before maturity, it is usually settled by delivering the assets underlying the contract.
- When there are alternatives about what is delivered, where it is delivered, and when it is delivered, the party with the short position chooses.
- A few contracts (for example, those on stock indices and Eurodollars) are settled in cash. When there is cash settlement, contracts are traded until a predetermined time. All are then declared to be closed out.

## Example: Report of Daily Delivery Notices

```
DLV615-T                                  CME CLEARING
BUSINESS DATE: 09/13/2022          DAILY DELIVERY NOTICES                   RUN DATE: 09/13/2022
PRODUCT GROUP: METALS                                                       RUN TIME: 21:15:56
```

EXCHANGE: COMEX
CONTRACT: SEPTEMBER 2022 COMEX 100 GOLD FUTURES
SETTLEMENT: 1,705.000000000 USD
INTENT DATE: 09/13/2022 DELIVERY DATE: 09/15/2022

| FIRM | ORG | FIRM NAME | ISSUED | STOPPED |
|---|---|---|---|---|
| 118 | C | MACQUARIE FUT | | 8 |
| 132 | C | SG AMERICAS | | 86 |
| 323 | C | HSBC | | 19 |
| 435 | H | SCOTIA CAPITAL | | 16 |
| 624 | H | BOFA SECURITIES | | 255 |
| 657 | C | MORGAN STANLEY | | 37 |
| 661 | C | JP MORGAN | 616 | 267 |
| 685 | C | RJ OBRIEN | 20 | |
| 690 | C | ABN AMRO | | 28 |
| 709 | C | BARCLAYS | 139 | |
| 732 | C | RBC CAP MARKETS | | 2 |
| 737 | C | ADVANTAGE | | 12 |
| 800 | C | MAREX SPEC | | 32 |
| 905 | C | ADM | | 13 |
| | | TOTAL: | 775 | 775 |
| | | MONTH TO DATE: | | 4,664 |

EXCHANGE: COMEX
CONTRACT: SEPTEMBER 2022 COMEX COPPER FUTURES
SETTLEMENT: 3.581000000 USD
INTENT DATE: 09/13/2022 DELIVERY DATE: 09/15/2022

| FIRM | ORG | FIRM NAME | ISSUED | STOPPED |
|---|---|---|---|---|
| 132 | C | SG AMERICAS | | 7 |
| 159 | C | ED&F MAN CAP | 8 | 4 |
| 365 | C | ED&F MAN CAPITA | 1 | |
| 686 | C | STONEX FINANCIA | 4 | 2 |
| 732 | C | RBC CAP MARKETS | | 1 |
| 737 | C | ADVANTAGE | 2 | 1 |
| | | TOTAL: | 15 | 15 |
| | | MONTH TO DATE: | | 1,288 |

The issued column in the above daily delivery notice shows the number of contracts for which a short party issued the notice to deliver. The stopped column shows the number of contracts for which a long party has been assigned to take delivery.

## Futures Price Patterns

Futures prices can be

- an increasing function of maturity: normal market
- a decreasing function of maturity: inverted market
- partly normal, partly inverted

## Futures Quotes Example

CME Crude Oil Futures Quotes on Sep 14, 2022

| MONTH | LAST | CHANGE | PRIOR SETTLE | OPEN | HIGH | LOW | VOLUME | UPDATED |
|---|---|---|---|---|---|---|---|---|
| **OCT 2022** | 89.98 | +2.67 (+3.06%) | 87.31 | 87.94 | 90.00 | 86.18 | 212,151 | 11:30:13 CT, 14 Sep 2022 |
| **NOV 2022** | 89.43 | +2.54 (+2.92%) | 86.89 | 87.24 | 89.47 | 85.75 | 115,561 | 11:30:11 CT, 14 Sep 2022 |
| **DEC 2022** | 88.61 | +2.36 (+2.74%) | 86.25 | 86.75 | 88.66 | 85.10 | 81,300 | 11:30:11 CT,m 14 Sep 2022 |
| **JAN 2023** | 87.61 | +2.11 (+2.47%) | 85.50 | 85.77 | 87.65 | 84.40 | 29,579 | 11:30:06 CT, 14 Sep 2022 |
| **FEB 2023** | 86.52 | +1.77 (+2.09%) | 84.75 | 85.16 | 86.66 | 83.76 | 16,367 | 11:29:54 CT, 14 Sep 2022 |
| **MAR 2023** | 85.59 | +1.56 (+1.86%) | 84.03 | 83.75 | 85.79 | 82.99 | 22,638 | 11:29:59 CT, 14 Sep 2022 |
| **APR 2023** | 84.70 | +1.35 (+1.62%) | 83.35 | 83.73 | 84.98 | 82.33 | 9,247 | 11:29:52 CT, 14 Sep 2022 |
| **MAY 2023** | 83.98 | +1.29 (+1.56%) | 82.69 | 82.87 | 84.13 | 82.00 | 5,548 | 11:29:36 CT, 14 Sep 2022 |
| **JUN 2023** | 83.26 | +1.23 (+1.50%) | 82.03 | 82.27 | 83.50 | 81.05 | 25,641 | 11:30:13 CT, 14 Sep 2022 |
| **JUL 2023** | 82.33 | +0.95 (+1.17%) | 81.38 | 81.73 | 82.60 | 80.44 | 2,039 | 11:29:36 CT, 14 Sep 2022 |
| **AUG 2023** | 81.61 | +0.88 (+1.09%) | 80.73 | 80.12 | 82.05 | 80.12 | 1,084 | 11:26:42 CT, 14 Sep 2022 |
| **SEP 2023** | 80.91 | +0.78 (+0.97%) | 80.13 | 79.71 | 81.33 | 79.71 | 3,063 | 11:29:54 CT, 14 Sep 2022 |

## Types of Orders

- Limit
- Stop-loss
- Stop-limit
- Market-if touched
- Discretionary
- Time of day
- Open
- Fill or kill

## Regulation of Futures

- Regulation is designed to protect the public interest.
- Regulators try to prevent questionable trading practices by either individuals on the floor of the exchange or outside groups.
- For example, regulations try to prevent the practice of cornering the market or excessive speculation through price limits.

## Accounting & Tax

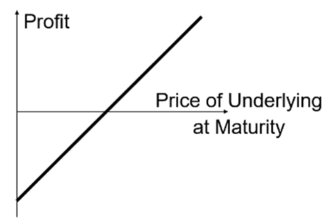
The Accounting and tax treatment of futures in the U.S. and many other countries attempts to

- recognize hedging profits or losses at the same time as the losses or profits on the item being hedged
- recognize profits and losses from speculation as they are incurred

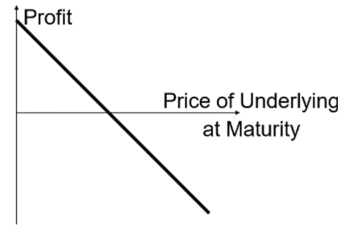
## Forward Contracts

- A forward contract is an OTC agreement to buy or sell an asset at a certain time in the future for a certain price.
- There is no daily settlement (but collateral may have to be posted).
- At the end of the life of the contract one party buys the asset for the agreed price from the other party.

Profit from a Long Forward or Futures Position




Profit from a Short Forward or Futures Position



## Forward Contracts vs Futures Contracts

| Forwards | Futures |
|---|---|
| Private contract between two parties | Exchange traded |
| Non-standard contract | Standard contract |
| Usually 1 specified delivery date | Range of delivery dates |
| Settle at end of contract | Settled daily |
| Delivery or final cash settlement usually takes place | Contract is usually closed out prior to maturity |
| Some credit risk | Virtually no credit risk |

## Foreign Exchange Quotes

- Futures exchange rates are quoted as the number of USD per unit of the foreign currency.
- Forward exchange rates are quoted in the same way as spot exchange rates.
- This means that GBP, EUR, AUD, and NZD are USD per unit of foreign currency.
- Other currencies (e.g., CAD and JPY) are quoted as units of the foreign currency per USD.