

CONCEPT NOTE • HULL CH 2

How a futures market makes strangers safe to trade with

A futures contract is a forward that has been standardized, cleared and settled every day. Follow one real position through its margin account and the rest of the market's plumbing falls into place.

THE IDEA

A futures contract is the same promise as a forward: buy or sell an asset at a fixed price on a later date. What changes is the plumbing. The contract is made identical for everyone so it can trade on an exchange, a clearing house steps into the middle of every trade, and every position is settled in cash at the end of every day. Daily settlement is what lets you trade with someone you have never met.

One decision, and everything downstream of it

A forward is a private contract. You negotiate the quantity, the grade, the place and the date, and you carry the risk that the other side cannot pay. That works between a bank and a client it knows. It does not work between strangers.

A futures exchange fixes this with one decision: **every contract is identical**. The specification for WTI crude oil on NYMEX (ticker CL) already settles every term:

TERM	WTI CRUDE OIL FUTURES (CL)
Size and quote	1,000 barrels, priced in dollars and cents per barrel, so each \$1.00 move is \$1,000 per contract
Delivery	Physical, at Cushing, Oklahoma, light sweet crude within set limits on density and sulfur
Months	Every month. Codes F G H J K M N Q U V X Z run January to December, so CLX6 is November 2026

Because the contract is a document rather than a negotiation, anyone can trade it with anyone. That buys you an **exchange**. An anonymous exchange needs someone to guarantee every trade, which buys you a **clearing house**. A clearing house that guarantees billions of dollars of promises cannot wait months to find out who lost, so it collects losses **every day**. That last step is the margin account.

The other differences you will read about between forwards and futures follow from the same chain. A futures position is usually closed out before maturity rather than delivered, it can allow a window of delivery dates rather than one, and because losses are collected daily it carries almost no credit risk.

The margin account

When you open a position you post **initial margin** with your broker. Every evening the exchange publishes a **settlement price** for each contract, its official closing value, and your account is credited or debited by that day's change. This is **marking to market**. If the balance falls below the **maintenance margin**, you get a **margin call** and must deposit enough to bring the account back to the **initial margin**, not just to the maintenance level. Money that flows in and out each day is called **variation margin**.

A long position in n contracts of q units each gains $n \times q \times (F_t - F_{t-1})$ on day t , where F_t is the settlement price (\$ per unit); a short has the sign flipped. The account survives until the cumulative loss exceeds the gap between initial and maintenance margin, so a long gets a call when

$$F_t < F_0 - \frac{\text{IM} - \text{MM}}{q}$$

with IM and MM the per-contract initial and maintenance margins in dollars. For a short, the call is triggered when the price rises above $F_0 + (\text{IM} - \text{MM})/q$.

REAL MARKET DATA

WTI crude, November 2026 contract (CLX6), daily closes from Wednesday, September 23 to Friday, October 2, 2026 (NYMEX, via Yahoo Finance; the exchange's official settlement can differ by a few cents). The margin levels are illustrative round numbers: check CME for the current requirement.

You go long **1 contract at the close of 92.16** on September 23. Initial margin **\$9,000**, maintenance margin **\$7,000**. The position controls $1,000 \times 92.16 = \$92,160$ of oil on \$9,000 of cash, about 10.2 times leverage. The call fires below $92.16 - 2,000/1,000 = 90.16$.

DATE	CLOSE	CHANGE	GAIN OR LOSS	BALANCE	MARGIN CALL
Sep 23 (entry)	92.16			9,000	
Sep 24	94.61	+2.45	+2,450	11,450	
Sep 25	92.41	-2.20	-2,200	9,250	
Sep 28	92.60	+0.19	+190	9,440	
Sep 29	89.38	-3.22	-3,220	6,220	+2,780
Sep 30	90.42	+1.04	+1,040	10,040	
Oct 1	92.87	+2.45	+2,450	12,490	
Oct 2	91.11	-1.76	-1,760	10,730	

On September 29 the balance drops to 6,220, below 7,000, so you deposit 2,780 to restore it to 9,000. If you close out at 91.11 on October 2, you put in $9,000 + 2,780 = 11,780$ and take out 10,730: a loss of 1,050, which is exactly $1,000 \times (91.11 - 92.16)$.

Three things in that table are worth slowing down for.

- **The total profit is the same as a forward's.** Add up the daily gains and you get $n \times q \times (F_T - F_0)$. Daily settlement changes *when* the money moves, not *how much*.

- **The top-up goes back to initial margin.** Maintenance is the tripwire; initial is where you get put back. Topping up only to 7,000 would leave you one bad day from another call.
- **You can be right and still have to find cash.** Oil finished only \$1.05 below your entry and closed above it on four of the seven days, yet you needed \$2,780 at short notice. A trader who could not wire it would have been closed out at the low. Margin turns a price risk into a cash-flow risk.

The clearing house: who is on the other side

When you buy a contract, the clearing house replaces the trade. One contract between you and a seller becomes two: you and the clearing house, and the clearing house and the seller. This is **novation**. The clearing house is the buyer to every seller and the seller to every buyer, so its own position is always flat. It can promise everyone because it collects margin from everyone, every day.

That raises the obvious question: who guarantees the clearing house? If a member defaults, its losses are absorbed in a fixed order: the defaulter's own margin, then its contribution to a shared default fund, then some of the clearing house's own capital, then the default-fund contributions of the members who did nothing wrong, and finally extra assessments on those members. The last two layers are **mutualization**. The risk did not disappear; it was pooled.

Derivatives traded privately (over the counter) are cleared bilaterally under an ISDA master agreement, with a credit support annex saying what collateral each side posts. Since the 2008 crisis, standard over-the-counter trades between financial firms must go through a central clearing house, and non-standard ones must post both initial and variation margin. The system is safer and also more concentrated: a handful of clearing houses now sit at the center of it.

How a position ends

- **Closing out.** You leave by taking the opposite trade, not by asking anyone. A long sells the same contract and the clearing house nets the two to zero. Only a small fraction of contracts, usually well under 1%, ever reach delivery.
- **Open interest** counts contracts outstanding. When a trade happens it rises by one if both sides are opening new positions, is unchanged if one opens and one closes, and falls by one if both are closing. Daily volume can exceed open interest when the same contracts change hands many times in a day.
- **Delivery.** Where the contract allows a choice of grade, location or timing, the **short** chooses. That choice is an option, and it has value to the short.
- **Cash settlement.** Some assets cannot be delivered. The E-mini S&P 500 contract settles in cash against a special opening value of the index on the final day.

Convergence. As delivery approaches, the futures price must move to the spot price. If the futures price sat above spot during the delivery period, you could short the futures, buy the asset, deliver it at once and keep the difference with no risk. If it sat below, a buyer would go long and take delivery instead of buying in the spot market. Either way the gap is arbitrated away. Why the two prices differ *before* delivery is a question about financing and storage costs, and it belongs to forward pricing (Hull Ch 5).

What the textbook version leaves out

- **Margins move.** Exchanges raise margin requirements when markets turn volatile, which can force a call on a position that has not lost a cent.

- **Liquidity lives in the front months.** Volume collapses in contracts more than a few months out, which matters the moment you need to get out.
 - **Settlement price, not last trade.** Your account is marked to the exchange's settlement price, which is set by a rule over a closing window and can differ from the last price you saw.
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CHECK YOURSELF

1. You go short 3 soybean futures contracts (5,000 bushels each) at \$10.80 per bushel. Initial margin is \$2,600 per contract and maintenance margin is \$2,200 per contract. Above what futures price do you get a margin call?
2. Settlement prices over the next three days are 10.74, 10.86 and 10.93. Find the balance at the end of each day and the size of any margin call.
3. Open interest in a contract is 1,000. A trader who is long 5 contracts sells 5 to a trader who is short 5 and wants to close out. What is open interest after the trade?

ANSWERS

1. The buffer is $2,600 - 2,200 = 400$ per contract, which is $400/5,000 = \$0.08$ per bushel. A short loses when the price rises, so the call fires above $10.80 + 0.08 = \$10.88$.
2. Start at $3 \times 2,600 = 7,800$; maintenance is $3 \times 2,200 = 6,600$; each cent is worth $3 \times 5,000 \times 0.01 = \150 . Day 1: price falls 0.06, short gains 900, balance 8,700. Day 2: price rises 0.12, loss 1,800, balance 6,900 (no call; 10.86 is below 10.88). Day 3: price rises 0.07, loss 1,050, balance 5,850, below 6,600: deposit 1,950 to restore 7,800.
3. Both traders are closing, so open interest falls by 5 to 995.