CHARTA LEARNING · LESSON NOTES

Futures Markets

FRM Part I

1 A story: the farmer and the baker

- Farmer fears a price fall; baker fears a price rise
- Agree a price today for a delivery later
- A futures contract is that deal, standardized
- An exchange guarantees it; a deposit keeps both honest

IN THE LESSON

- Imagine a wheat farmer who plants in spring and harvests in autumn.
- She worries that the price will fall before she sells.
- A baker worries about the opposite: that the price will rise before he buys.
- They could agree today on a price for a delivery in autumn.
- That agreement is the idea behind a forward contract.
- A futures contract is the same idea made public and standard.
- Instead of finding each other and negotiating, both trade the same exchange contract, with fixed size, quality and dates.
- The exchange guarantees the deal, and a small deposit keeps both sides honest.
- Everything in this lesson is a detail of that simple arrangement.

2 What a futures contract is

- Standardized, exchange-traded agreement
- Price fixed today; delivery or settlement at a set date
- Long gains if the price rises; short if it falls
- Traders choose only price, delivery month and quantity

IN THE LESSON

- Here is the definition.
- A futures contract is a standardized agreement, traded on an exchange, to buy or sell a specified underlying asset at a price fixed today, for delivery or settlement at a set future date.
- The buyer holds the long position and gains if the price rises.
- The seller holds the short position and gains if the price falls.
- Notice that nothing is paid for the contract itself when it is agreed.
- Its value starts at zero, and what moves between the parties later is the daily gain or loss.
- The exchange decides every feature in advance, so traders only choose the price, the delivery month and how many contracts to trade.

3 The key specifications

What the exchange fixes in advance, with oil as the illustration

Specification	Example
Underlying and grade	Crude oil, set quality
Contract size	1,000 barrels
Delivery months and place	Set by the exchange
Price quotation	Dollars per barrel
Daily price limit	Cap on one-day move

IN THE LESSON

- The exchange writes the specification of each contract.
- First, the underlying asset and its grade: for example crude oil of a set quality, or a particular grade of wheat.
- Second, the contract size, such as one thousand barrels or five thousand bushels.
- Third, the delivery months and the delivery location, so everyone knows when and where the asset can be handed over.
- Fourth, the price quotation unit, such as dollars per barrel.
- Fifth, the daily price limit, which caps how far the price may move from the previous settlement in one session.
- Every trader, large or small, faces the same terms, and that sameness is what makes the contract easy to trade and easy to close out.

4 Example 1: sizing the exposure

Illustration: price $80 a barrel, contract size 1,000 barrels

One contract	1,000 × $80	**$80,000**
Ten contracts	10 × $80,000	**$800,000**
Gain if price +$2	10 × 1,000 × $2	**$20,000**
Price move in per cent	2 ÷ 80	**2.5%**

IN THE LESSON

- Here is why the contract size matters.
- All numbers are made up for illustration.
- Suppose crude oil futures trade at eighty dollars a barrel and one contract covers one thousand barrels.
- The value of one contract is one thousand times eighty, which is eighty thousand dollars.
- Now suppose you hold ten contracts.
- The exposure is ten times eighty thousand, which is eight hundred thousand dollars.
- If the price rises by two dollars, you gain ten contracts times one thousand barrels times two dollars, which is twenty thousand dollars.
- As a percentage, a two dollar move on eighty is only two point five per cent, yet the gain is large.
- Always multiply by the contract size before judging a position.

5 Volume and open interest

- Volume: contracts traded in a period, every trade counts
- Open interest: contracts outstanding, pairs counted once
- Both sides open: open interest rises
- Both sides close: it falls. One of each: unchanged

IN THE LESSON

- Two numbers describe how busy a futures market is, and they are easy to confuse.
- Trading volume counts the contracts traded in a period, usually a day.
- Each trade adds to volume.
- Open interest counts the contracts still outstanding at a point in time, with each long and short pair counted once.
- It measures how many positions are alive.
- How does a trade change open interest?
- If a new buyer and a new seller trade, a new pair appears, so open interest rises.
- If a holder closes with someone who is also closing, a pair disappears and open interest falls.
- If one side opens and the other closes, a position only changes hands, and open interest does not move.

6 How each trade moves open interest

Volume always rises when a trade occurs; open interest depends on who trades

Type of trade	Open interest
New buyer, new seller	Rises
Long and short both close	Falls
New buyer, existing long sells	Unchanged
Volume in all three cases	Rises

IN THE LESSON

- Let's put the three cases side by side.
- In the first case a new buyer and a new seller both open positions.
- Volume goes up by the number of contracts traded, and so does open interest.
- In the second case two existing holders, one long and one short, trade with each other to close.
- Volume still rises, but open interest falls, because both positions disappear.
- In the third case a new trader buys from an existing long who is selling out.
- Volume rises, yet the number of outstanding pairs is the same, so open interest is unchanged.
- The lesson is that volume only ever goes up within a day, while open interest can rise, fall or stay put.

7 Example 2: one day of trading

Illustration: contracts, starting from zero open interest

Ann buys 10 from Bob	both new: volume +10	**Open int. 10**
Ann sells 4 to Cy	Cy new: volume +4	**Open int. 10**
Ann sells 6 to Bob	both close: volume +6	**Open int. 4**
Day total volume	10 + 4 + 6	**20**
Open interest at close	Cy long 4, Bob short 4	**4**

IN THE LESSON

- Let's follow one made up day.
- We start with no open positions.
- First, Ann buys ten contracts from Bob.
- Both are new, so volume is ten and open interest is ten.
- Second, Ann sells four of her contracts to Cy, who is new.
- Volume is four, but Ann's long simply passes to Cy, so open interest stays at ten.
- Third, Ann sells her remaining six contracts to Bob, who is short ten.
- Ann's long closes and Bob's short shrinks, so six pairs vanish.
- Volume is six, and open interest falls to four.
- At the close of the day, total volume is twenty contracts, while open interest is only four, held by Cy long and Bob short.

8 Example 3: the daily price limit

Illustration: settlement $80, limit $3, contract 1,000 barrels

Highest price allowed	80 + 3	**$83**
Lowest price allowed	80 − 3	**$77**
One-day limit move, one contract	3 × 1,000	**$3,000**

IN THE LESSON

- Next, the daily price limit.
- It caps how far the price may move from the previous settlement in one session.
- Suppose, as an illustration, that oil futures settled yesterday at eighty dollars and the exchange limit is three dollars.
- Today the highest permitted price is eighty plus three, which is eighty three dollars.
- The lowest is eighty minus three, which is seventy seven dollars.
- Trading may not take place outside that range.
- Now what does a limit move cost a holder of one contract of one thousand barrels?
- Three dollars times one thousand is three thousand dollars in a single day.
- If the price wants to go further, it can only close at the limit, and the move continues the next session.

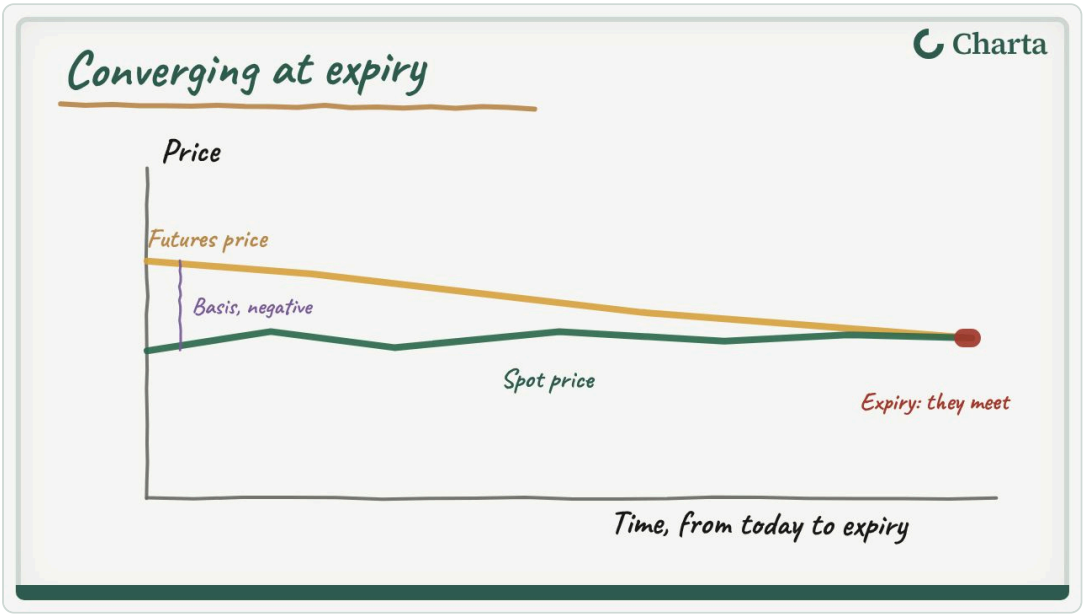
9 Why futures and spot prices converge

- Spot: price for the asset now. Futures: price for later
- At expiry, a futures contract is just buying the asset
- Same asset, same day, so same price
- Basis = spot − futures, tends to zero at expiry

IN THE LESSON

- Now an important idea: convergence.
- The spot price is the price for buying the asset immediately.
- The futures price is the price agreed today for a later date.
- They can differ well before expiry, but as the delivery date nears they come together.
- The reason is simple.
- At expiry, the futures contract is an obligation to exchange the asset for the futures price, so it is economically the same as buying the asset right away.
- Two ways of buying the same thing on the same day cannot have lasting different prices.
- Basis is spot minus futures, and it tends to zero at expiry.
- Before expiry it can be positive or negative.

10 Converging at expiry



IN THE LESSON

- Here is the picture.
- Along the bottom is time, running from today on the left to the expiry date on the right.
- Up the side is price.
- The amber line is the futures price, and the green line is the spot price.
- At the start, in this illustration, futures sit above spot, so the basis, spot minus futures, is negative.
- The spot price wanders up and down, as real prices do.
- The futures price slopes down toward it.
- At the right edge the two lines meet, because the contract has become the same thing as buying the asset.
- The gap you see before that is the basis, and watching it shrink is what convergence means in practice.

11 Arbitrage forces the meeting

- Futures above spot: buy spot, sell futures, deliver
- That selling pushes the futures price down
- Futures below spot: buy futures, take delivery, sell spot
- That buying pushes the futures price up

IN THE LESSON

- What keeps the two prices together is arbitrage, which means locking in a risk-free profit from a price gap.
- Suppose in the delivery month the futures price sat above the spot price.
- An arbitrageur would buy the asset at spot, sell the futures contract and deliver, collecting the higher futures price.
- The selling pressure on futures would push its price down.
- Now suppose the futures price sat below spot.
- The arbitrageur would buy the futures contract, take delivery, and sell the asset at the higher spot price.
- The buying pressure would push the futures price up.
- Either way, the gap is squeezed shut.
- That is why the two prices end up the same at expiry.

12 Basis and the effective price

Basis = Spot − Futures
Effective price = F_1 + Basis at close-out

Spot price	Price for immediate purchase
Futures price	Futures: price at close-out
Initial futures	F_1: futures price at hedge start
Basis	Spot minus futures at close-out
Effective price	What the hedger really gets

IN THE LESSON

- Now a point that matters for anyone using futures to hedge.
- Basis is the spot price minus the futures price.
- Suppose a producer sells a futures contract to protect the price of an asset she will sell later.
- If she holds the contract to expiry, the basis is zero and she gets close to the original futures price.
- But most hedgers close out before expiry, and then the basis may not be zero.
- The effective price she receives is the initial futures price, which we call F one, plus the basis at the time of close-out.
- So the hedge removes most of the price risk but leaves basis risk, which is the uncertainty about the basis when she closes.
- The effective price is not simply the initial futures price.

13 Example 4: a hedge with basis risk

Illustration: futures sold at $80; close-out spot $76, futures $77

Basis at close-out	76 − 77	**−$1**
Futures gain	80 − 77	**+$3**
Oil sold at spot	spot price	**$76**
Effective price	76 + 3	**$79**
Check: F_1 + basis	80 + (−1)	**$79**

IN THE LESSON

- A producer sells oil futures at eighty dollars to lock in a price.
- Three months later, before expiry, she closes the hedge and sells her oil at the spot price.
- The numbers are made up.
- At that moment spot is seventy six dollars and futures are seventy seven dollars.
- So the basis, spot minus futures, is minus one.
- She buys back the futures at seventy seven after selling at eighty, so the futures gain is three.
- She sells the oil for seventy six, plus the three dollars, for seventy nine.
- As a check, the initial futures price of eighty plus the basis of minus one is seventy nine.
- She did not get eighty, because the basis moved against her.

14 What the exchange does

- An organized venue where trades are matched
- Standardized contracts that can be freely traded
- Through the clearing house, a guarantee of performance
- Non-members clear through a clearing member

IN THE LESSON

- Why do we need an exchange at all?
- It performs several functions.
- It provides an organized venue where buyers and sellers meet and trades are matched.
- It defines the standardized contracts, so that every contract of a given type is identical and can be traded freely.
- And, through its associated clearing house, it guarantees performance.
- Many futures participants never speak to each other.
- They send an order, it is matched, and the clearing house takes over.
- Trades by non-members are cleared through a clearing member, which is a firm that belongs to the clearing house and stands behind its customers.
- This arrangement is what turns a private promise into a market that anyone can use safely.

15 The clearing house in the middle

- Clearing house: buyer to every seller, seller to every buyer
- Original traders never face each other's credit risk
- Any identical contract closes a position
- Longs equal shorts, so its risk is default, not price

IN THE LESSON

- Here is the trick that makes futures safe.
- Once a trade is matched, the clearing house becomes the buyer to every seller and the seller to every buyer.
- The two original traders no longer face each other, so neither bears the other's credit risk.
- This has a useful side effect.
- A long can close a position by selling an identical contract to anyone at all, because the contract is with the clearing house, not with the original counterparty.
- Notice also that the clearing house holds equal long and short positions, so it carries no net market risk.
- Its only risk is that a member defaults, not that prices move.
- That is why it works so hard to control default.

16 How the clearing house protects itself

- Initial margin: a deposit when a position opens
- Variation margin: daily payment of gains and losses
- Daily settlement: no loss is allowed to build up
- Member default contributions as a final layer

IN THE LESSON

- A guarantee is only as good as its backing, so the clearing house protects itself in layers.
- The first layer is initial margin, a deposit every member must post when a position is opened.
- The second is variation margin, which is the daily payment that moves gains and losses between accounts, so that no loss builds up.
- The third is daily settlement itself: positions are revalued every day and cash changes hands every day.
- The fourth is member contributions to a default fund, which can absorb a loss if a member fails and its margin is not enough.
- These layers together mean a single failure is unlikely to spread to other members, and that is why the credit risk of futures is small.

17 Delivery: the short is in charge

- Most positions are closed out before delivery
- The short picks the timing, the place and, often, the grade
- The short gives notice of intention to deliver
- The long pays the invoice price from the settlement price

IN THE LESSON

- What happens at the end of a contract?
- In practice, most futures positions are closed out with an offsetting trade before the delivery period, so only a tiny fraction ends in delivery.
- When delivery does occur, the short has the choices.
- The short chooses the timing within the delivery period and the delivery location, and, where several grades are allowed, the grade.
- The short also gives notice of intention to deliver.
- The long then pays the invoice price, which is based on the final settlement price.
- It makes sense that the short holds the options, because someone has to physically supply the asset, and the short is the one who has to find it.

18 Example 5: a bond futures invoice

Illustration, per 100 of face: settlement 120, factor 1.08, accrued 1.5

Settlement × factor	120 × 1.08	**129.6**
Add accrued interest	129.6 + 1.5	**131.1**
Invoice paid by the long	per 100 of face	**131.1**

IN THE LESSON

- Bond futures add one twist.
- Because several bonds can be delivered, the exchange gives each a conversion factor to make them comparable.
- The short receives the settlement price times the conversion factor, plus accrued interest.
- Here are made up numbers per one hundred of face value.
- The settlement price is one hundred and twenty, the conversion factor of the bond delivered is one point zero eight, and accrued interest is one point five.
- Settlement times factor is one hundred and twenty times one point zero eight, which is one hundred and twenty nine point six.
- Add accrued interest of one point five and the invoice is one hundred and thirty one point one.
- That is what the long pays per one hundred of face value.

19 Example 6: cheapest to deliver

Illustration: settlement 120. A quoted 125, factor 1.02. B quoted 131, factor 1.08

Bond A cost	125 − 120 × 1.02	**2.6**
Bond B cost	131 − 120 × 1.08	**1.4**
Cheapest to deliver	lowest cost	**Bond B**

IN THE LESSON

- Which bond will the short deliver?
- The one that costs least relative to what the short receives.
- The short buys a bond at its quoted price and receives the settlement price times the conversion factor, so the cost of delivery is the quoted price minus settlement price times the factor.
- Take a settlement price of one hundred and twenty and two possible bonds.
- Bond A is quoted at one hundred and twenty five with a factor of one point zero two.
- Its cost is one twenty five minus one hundred and twenty two point four, which is two point six.
- Bond B is quoted at one hundred and thirty one with a factor of one point zero eight.
- Its cost is one thirty one minus one twenty nine point six, which is one point four.
- Bond B is the cheapest to deliver.

20 Physical delivery versus cash settlement

Both end the same economically; they differ in what changes hands

Feature	How it works
Physical delivery	Asset handed over for payment
Who chooses details	The short: time, place, grade
Cash settlement	Final price = spot value
What is paid	Only the cash difference
Typical underlying	Index: cash. Commodity: physical

IN THE LESSON

- Not every contract delivers an asset.
- Cash-settled contracts, such as equity index futures, deliver nothing.
- It would be impractical to hand over every share in an index.
- Instead, the final settlement price equals the spot value of the index, and the difference is paid in cash.
- This avoids the cost and trouble of physical delivery.
- Physical delivery, by contrast, suits commodities and bonds, where the actual asset can be moved.
- In both cases the economics are the same: the long ends with the gain or loss from the price change.
- Delivery gives the short choices and creates costs, while cash settlement is simple and cheap but gives no asset.

21 Order types compared

Every order trades certainty of a fill against control of price

Order	How it behaves
Market	Fills now, price uncertain
Limit	Price held, fill uncertain
Stop	Becomes market at stop level
Stop-limit	Becomes limit at stop level
Market-if-touched	Becomes market at good level

IN THE LESSON

- Now to orders, which specify how and when a trade is executed.
- A market order is filled immediately at the best available price, so execution is certain but the price is not.
- A limit order sets the worst acceptable price: the limit or lower for a buy, the limit or higher for a sell.
- The price is controlled, but a fill is not guaranteed.
- A stop order, or stop-loss, becomes a market order once the market trades at the stop level.
- A stop-limit order becomes a limit order once triggered.
- A market-if-touched order becomes a market order when a favorable level is touched.
- So every order trades off certainty of execution against control of price.

22 Where each order sits

- Sell stop below the market protects a long
- Buy stop above the market protects a short
- Limit buy below, limit sell above the market
- Market-if-touched waits for a favorable level

IN THE LESSON

- Placement matters.
- A sell stop is placed below the current market and protects a long position: if the price falls to the stop level, the order becomes a market order and the position is sold.
- A buy stop is placed above the market and protects a short position.
- A limit order to buy sits below the market, hoping for a better price, and a limit order to sell sits above it.
- A market-if-touched order is the reverse of a stop: it waits for a favorable level, for example a buy at a lower price, and then trades at market.
- The trap is that a stop is not a guaranteed price.
- Once triggered it is a market order and fills at the next available price.

23 Example 7: a stop in a gap

Illustration: long at 50, sell stop at 48, market gaps to open at 46

Sell stop placed at	protects the long	**48**
Market opens at	gap through the stop	**46**
Stop fills at	next available price	**46**
Worse than the stop level	48 − 46	**2 per unit**
Stop-limit at 48 instead	limit not reachable	**No fill**

IN THE LESSON

- Let's see the trap with made up numbers.
- You are long a contract at fifty and you place a sell stop at forty eight to limit your loss.
- Overnight there is bad news, and the market opens at forty six, gapping through your stop.
- The stop is triggered and becomes a market order.
- It fills at the next available price, which is forty six, not forty eight.
- You lose two more per unit than you planned.
- Compare a stop-limit order with a limit of forty eight.
- Once triggered it becomes a limit order to sell at forty eight or higher, but the market is at forty six, so it goes unfilled.
- The stop-limit controls the price but leaves you holding the position.

24 Marking to market

- Revalued daily at the settlement price
- Gain or loss moved into or out of the margin account
- Below maintenance: deposit restores to initial margin
- Long's daily settlements total final price − entry price

IN THE LESSON

- Now we come to the daily mechanics.
- Marking to market means that a futures position is revalued every day at the settlement price, and the gain or loss is moved into or out of the margin account that day.
- A long gains when the settlement price rises, and a short gains when it falls.
- The investor first posts initial margin.
- If the balance drops below the maintenance level, a margin call requires a deposit of variation margin.
- And here is a detail that matters: the deposit must restore the account to the initial margin level, not just to the maintenance level.
- Over the whole life of a long position, the daily settlements add up to the final price minus the entry price.

25 Example 8: a margin account day by day

Illustration: long 1,000 barrels at 80. Initial margin $6,000, maintenance $4,500

Day 1: settles at 79	6,000 − 1,000	**$5,000**
Day 2: settles at 77	5,000 − 2,000	**$3,000**
Margin call to restore	6,000 − 3,000	**$3,000**
Day 3: settles at 78	6,000 + 1,000	**$7,000**
Check: total settled	(78 − 80) × 1,000	**−$2,000**

IN THE LESSON

- Here is a made up account.
- You buy one contract of one thousand barrels at eighty.
- Initial margin is six thousand dollars and maintenance margin is forty five hundred.
- On day one the settlement price is seventy nine, a loss of one thousand, leaving five thousand, which is above maintenance.
- On day two it settles at seventy seven, a loss of two thousand, leaving three thousand, below maintenance.
- You must deposit enough to return to six thousand, so the call is three thousand dollars, not fifteen hundred.
- On day three the price rises to seventy eight, a gain of one thousand, so the balance is seven thousand.
- As a check, the total settled is seventy eight minus eighty, times one thousand, which is minus two thousand dollars.

26 Hedge accounting

- Problem: futures gains hit earnings before the hedged item
- Solution: record both in the same period
- Needs a designated, documented hedging instrument
- Effect: lower earnings volatility

IN THE LESSON

- Marking to market creates a reporting problem.
- A company that uses futures to hedge a future sale or purchase sees gains and losses on the futures every day, but the thing it is hedging is not yet recognized in its accounts.
- Without special treatment, the futures gains and losses hit earnings as they arise, and earnings jump around even though the company has actually reduced its risk.
- Hedge accounting solves this.
- It lets the gain or loss on a designated, documented hedging instrument be recognized in earnings in the same period as the hedged item.
- The two effects are recorded together, which reduces earnings volatility.
- The key requirement is that the hedge is designated and documented in advance.

27 Forwards and futures compared

Same idea, different structure

Feature	Forward | Futures
Where traded	Private | Exchange
Terms	Custom | Standard
Settlement	Once | Daily
Credit risk	Counterparty | Small
Usually ends	Delivery | Closed out

IN THE LESSON

- Now let's contrast forwards and futures.
- They are similar: both fix a price today for a transaction at a future date, and both can be used to hedge or to speculate.
- The differences are about structure.
- A forward is a private over-the-counter contract with customized terms.
- It is typically held to maturity and settled once, usually by delivery, and it carries counterparty credit risk.
- A futures contract is standardized, exchange-traded, cleared through a clearing house, margined and settled daily.
- It is usually closed out before delivery, so credit risk is small, liquidity is high and trading is regulated.
- The final economic result is similar, but the timing of cash flows, the credit risk and the customization are different.

28 Why prices can differ slightly

- Futures cash flows are settled and reinvested daily
- A forward settles once, so there is no such effect
- Price positively correlated with rates: futures higher
- For short maturities the difference is small

IN THE LESSON

- If a forward and a futures contract have the same terms, should their prices be equal?
- Almost, but not exactly.
- Futures gains and losses are settled daily, so the cash received or paid can be invested or financed at the prevailing interest rate.
- A forward settles only at the end, so there is no such effect.
- That interest on daily cash flows can make the futures price differ slightly from the forward price.
- When the asset price is positively correlated with interest rates, the futures price is higher.
- The reason is that gains tend to arrive when rates are high, so they can be reinvested at good rates, while losses must be funded when rates are low.
- For short maturities the difference is usually small.

29 Example 9: the same result, different timing

Illustration: long 1,000 units at 80; settlements 81, 83, 82, 84

Day 1: settles at 81	81 − 80 = +1	**+$1,000**
Day 2: settles at 83	83 − 81 = +2	**+$2,000**
Day 3: settles at 82	82 − 83 = −1	**−$1,000**
Day 4: settles at 84	84 − 82 = +2	**+$2,000**
Total = (84 − 80) × 1,000	same as the forward	**+$4,000**

IN THE LESSON

- Finally, a made up comparison of cash flows.
- An investor is long one thousand units at eighty, and the price rises to eighty four over four days, settling at eighty one, eighty three, eighty two and eighty four.
- With a forward, nothing happens until the end, when the investor receives the four dollar gain on one thousand units, four thousand dollars, in one payment.
- With a futures contract, the gain arrives daily.
- Day one is plus one dollar, so one thousand.
- Day two is plus two, so two thousand.
- Day three is minus one, so minus one thousand.
- Day four is plus two, so two thousand.
- Added up, that is again four thousand dollars, the final price minus eighty.
- The total is the same, but the timing differs.

30 Five mistakes to avoid

- Volume ≠ open interest: only new pairs raise open interest
- Effective price = F_1 + basis at close-out, not F_1 alone
- A stop fills at the next price, not at the stop price
- A margin call restores to initial, not maintenance margin
- Multiply by contract size when sizing a position

IN THE LESSON

- Mistake one: confusing volume with open interest.
- Volume counts every trade, while open interest counts outstanding pairs, and only new pairs raise it.
- Mistake two: thinking a hedger simply gets the initial futures price.
- The effective price is the initial futures price plus the basis at close-out.
- Mistake three: believing a stop order fills at the stop price.
- Once triggered it is a market order and fills at the next available price.
- Mistake four: restoring only to maintenance after a margin call.
- The deposit must bring the account back up to the initial margin level.
- And do not forget to multiply by the contract size when you size a position.

31 Recap: the main ideas

- Contract specs: underlying, size, months, quote, limit
- Volume ≠ open interest; spot and futures converge
- Clearing house in the middle; margin; daily settlement
- Delivery by the short, or cash; know the order types
- Marking to market; hedge accounting; forwards differ

IN THE LESSON

- Let's pull it together.
- A futures contract is a standardized exchange-traded agreement with a fixed underlying, size, delivery months, quotation and daily price limit.
- Volume counts trades; open interest counts outstanding pairs.
- Futures and spot prices converge at expiry because of arbitrage, but a hedger who closes early still bears basis risk.
- The exchange and clearing house stand between traders and guarantee performance with margin and daily settlement.
- Most positions are closed out, short chooses delivery details, and index futures settle in cash.
- Order types trade certainty for price control.
- Marking to market moves gains daily, and hedge accounting matches them to the hedged item.
- Forwards are private and settled once; futures are standard and settled daily.

32 Try three quick questions

1. New buyer and seller trade 20 contracts. Volume and open interest?
   Answer: Both rise by 20 contracts.
2. Sold futures at 90. Close-out spot 88, futures 89. Effective price?
   Answer: 90 + (88 − 89) = 89.
3. Balance $3,000; initial $6,000; maintenance $4,500. Call?
   Answer: $3,000, back to initial margin.

IN THE LESSON

- Now try three quick questions yourself.
- Pause after each one.
- Question one.
- A new buyer and a new seller trade twenty contracts.
- What happens to volume and to open interest?
- Both rise by twenty.
- Question two.
- A producer sells futures at ninety, then closes out when spot is eighty eight and futures are eighty nine.
- What effective price does she get?
- Ninety minus one, which is eighty nine.
- Question three.
- A long's margin account has dropped to three thousand dollars.
- Initial margin is six thousand and maintenance is forty five hundred.
- How large is the margin call?
- Three thousand dollars, to restore to initial margin.
- Check the answers on the board.