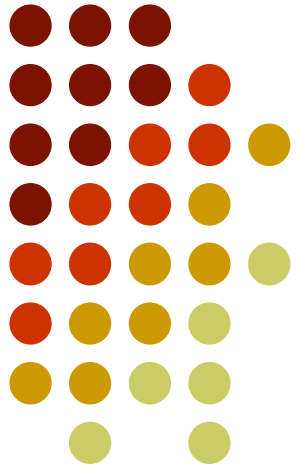
Futures

Chapter 10



Outline

- Terminology
- Margin
- Daily settlement
- Speculation and hedging
- Financial and currency futures
- Stock index futures
- Reference: BF Chap 29

Futures Contracts

- A formal agreement (contract) for the future delivery or receipt of a commodity or security at a specified price and time
- By contrast in a spot contract there is an agreement to buy or sell the asset immediately (or within a very short period of time)

Examples of Futures Contracts

Agreement to:

- buy 100 oz. of gold @ US$1750/oz. in December
- sell £62,500 @ 1.5500 US$/£ in March
- sell 1,000 bbl. of oil @ US$85/bbl. in April

Participants

- Participants in futures markets are either speculators or hedgers
- Speculators
  - Individuals who are willing to accept substantial risk for the possibility of a large return
  - The long position anticipates price increases
  - The short position anticipates price decreases
- Hedgers
  - Individuals or firms that enter into offsetting contracts
  - Use the contracts to reduce the risk of loss from fluctuating prices

Terminology

- Long position
  - Contract to accept delivery, to buy
- Short position
  - Contract to make delivery, to sell
- Futures price
  - Price for the future delivery of a commodity or financial asset
- Spot price
  - Current price of a commodity or financial asset

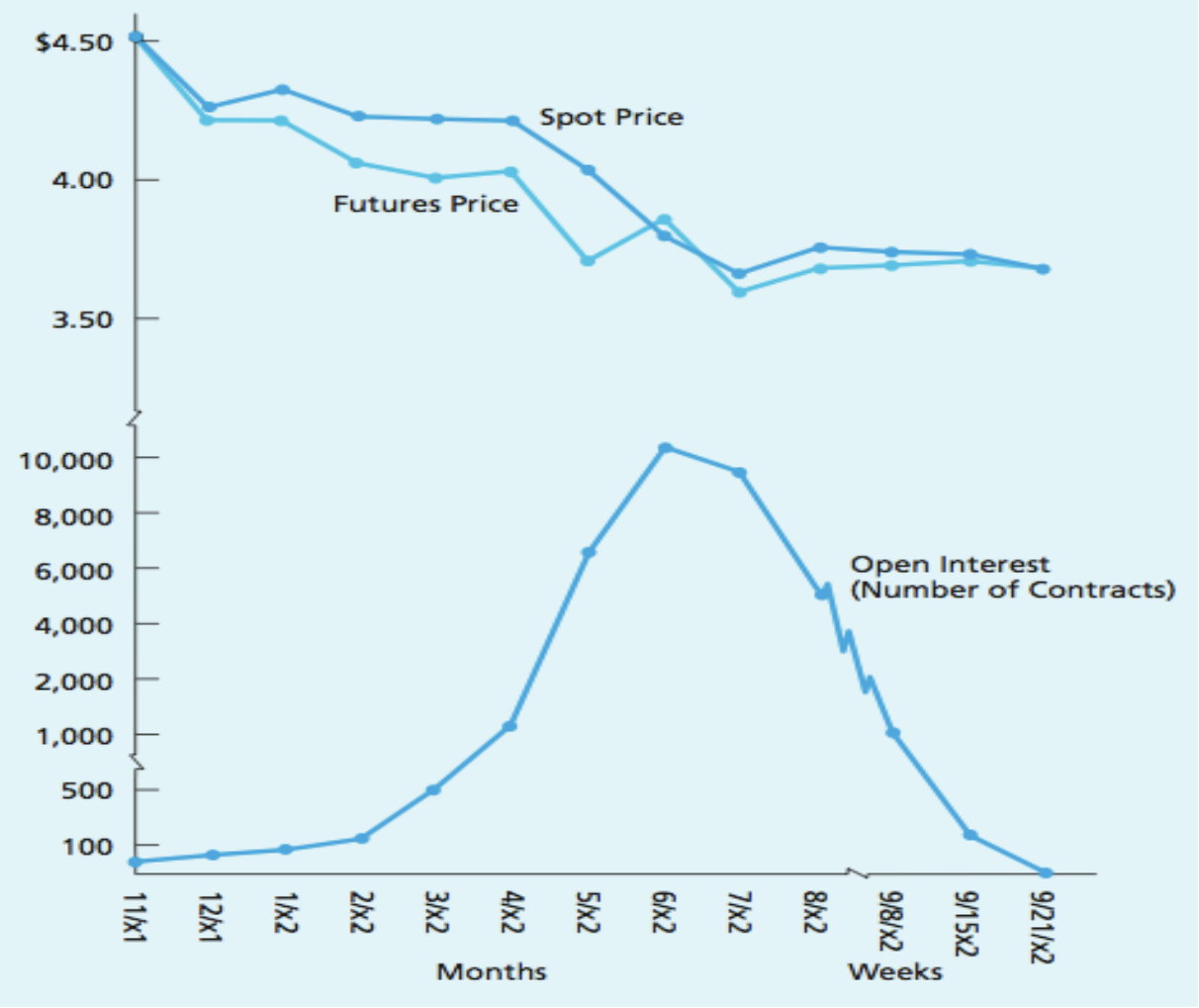
Terminology

- Open interest
  - The number of futures contracts in existence for a particular commodity
  - Open interest varies over the life of the contract.
  - Initially, the open interest rises as buyers and sellers establish positions.
  - Then it declines as the delivery date approaches and the positions are closed.

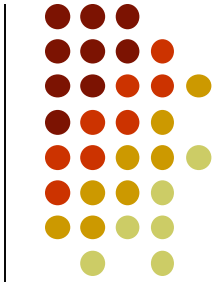
Spot and Futures Prices

- The spot price may be lower or higher than the futures price
- The spot and futures prices must converge with the approach of the expiration date

Example: September Contract



Closing a Futures Contract



- Closing a position in a futures by entering into the opposite position
  - A contract to sell “offsets” a contract to buy
  - A contract to buy “offsets” a contract to sell

Example

- January: an investor enters into a long futures contract to buy 100 oz of gold @ $1,750 per oz in April
- April: the price of gold is $1,825 per oz

What is the investor's profit or loss?

Futures and Leverage

- Futures offer large profits and losses
- Source of the leverage: the small margin requirement
- Margin requirement is a small percentage of the value of the contract

Margin

- A margin is cash or marketable securities deposited by an investor with his or her broker
  - Initial margin
  - Maintenance margin
  - Variation margin
- If funds in the account fall below the maintenance margin requirement, the investor received a margin call
  - Failure to meet the margin call results in the position being closed
- Futures positions are “marked to the market” daily
  - Margin adjustments occur daily – daily settlement

Margin

- The investor is entitled to withdraw any balance in the margin account in excess of the initial margin
- Margin minimizes the possibility of a loss through a default on a contract

Example of a Futures Trade

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

Daily Settlement

Day	*Trade price ($)*	*Settlement price ($)*	*Daily gain ($)*	*Cumulative gain ($)*	*Margin account 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	
3		1,244.60	1,260	−1,080	10,920	
4		1,241.30	−660	−1,740	10,260	
5		1,240.10	−240	−1,980	10,020	
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	
9		1,225.40	−1,080	−4,920	11,100	
10		1,228.10	540	−4,380	11,640	
11		1,211.00	−3,420	−7,800	8,220	3,780
12		1,211.00	0	−7,800	12,000	
13		1,214.30	660	−7,140	12,660	
14		1,216.10	360	−6,780	13,020	
15		1,223.00	1,380	−5,400	14,400	
16	1,226.90		780	−4,620	15,180	

Key Points About Futures

- They are settled daily
- Closing out a futures position involves entering into an offsetting trade
- Most contracts are closed out before maturity

Leverage: Example

- A U.S. investor in February thinks that the British pound will strengthen relative to the U.S. dollar over the next two months and is prepared to back that hunch with £250,000.

Table 1.4 Speculation using spot and futures contracts. One futures contract is on £62,500. Initial margin on four futures contracts = $20,000.

	Possible trades	
	Buy £250,000 *Spot price = 1.4470*	*Buy 4 futures contracts* *Futures price = 1.4410*
Investment	$361,750	$20,000
Profit if April spot = 1.5000	$13,250	$14,750
Profit if April spot = 1.4000	−$11,750	−$10,250

Hedging

- Buying or selling contracts to offset existing positions
- Growers and users of commodities seek to reduce the risk of loss from price fluctuations
- Hedgers forego the possibility of a large return to obtain future price certainty

Hedging: Example 1

- A wheat farmer expects to harvest a crop at a specified time. He decides to hedge using a short position in a futures contract.
  - The farmer has a long position (the wheat in the ground) and a short position (the sale of the contract for future delivery).
  - Such a position reduces the farmer's risk of loss from a price decline.
  - To obtain protection from the risk of loss, the farmer relinquishes the possibility of a larger profit.

Hedging: Example 1

- Suppose in June, the futures price of September contract is $3.75.
  - If the price of wheat declines to $3.50 in September, the farmer is still assured $3.75.
  - If the price of wheat rises to $4.10 in September, the farmer still receives only $3.75.

Hedging: Example 2

- A user of wheat (Kellogg) desires to know the future cost of wheat in order to plan production levels and the prices that will be charged to distributors. He decides to hedge using a long position in a futures contract.
  - The user has a long position (the futures contract to accept the future delivery of wheat) and short position (the future delivery of wheat for production of cereal)

Hedging: Example 2

- Suppose in June, the futures price of September contract is $3.75.
  - If the price of wheat rises to $4.10 in September, the company cannot be hurt by a price increase.
  - If the price of wheat declines to $3.50 in September, the company has forgone the chance of profit from a decline in the wheat price.

Financial and Currency Futures

- Financial futures
  - contracts for the future delivery of a financial asset
- Currency futures
  - contracts for the future delivery of a currency

Currency Futures: Example

- A firm contracts to buy a plant in Germany for €40,000,000 in six months. To avoid the possibility of loss through an increase in the price, the financial manager enters into a futures contract for the purchase of euros after six months.

Current Cost of the Plant	
1. Cost of the plant in euros	40,000,000
2. Cost of the plant in dollars (based on a $1.20 price of euros)	$48,000,000
Possible Gain from Decrease in the Cost of the Euro	
3. Cost of the plant in dollars (if the price of the euro declines to $1.15)	$46,000,000
4. Decrease in cost from the depreciation in the euro (line 2 minus line 3)	$2,000,000
Possible Loss from Increase in the Cost of the Euro	
5. Cost of the plant in dollars (if the price of the euro rises to $1.25)	$50,000,000
6. Increase in cost from the appreciation in the euro (line 5 minus line 2)	$2,000,000
Impact of Hedging	
7. Cost of the plant in dollars (based on the future contract price of euros)	$48,200,000
8. Cost of hedging (line 7 minus line 2)	$200,000

Stock Index Futures

- Contracts based on an index of security prices
- Settlement at the expiration or maturity of the contract occurs in cash. There is no physical delivery of securities.
- Example: The NYSE Composite Index futures contracts have a value that is $500 times the value of the NYSE Index.
  - If the NYSE Index is 100, the contract is worth $50,000.
  - If the NYSE Index rose to 105, the value of the contract would increase to $52,000.

Summary

- Main terminology
- Margin
  - Initial margin, maintenance margin, variation margin, margin call
  - Source of the leverage
- Daily settlement

Summary

- Speculation and hedging
  - Speculation: bet on the future direction of a market variable
  - Hedging: reduce risks
- Financial and currency futures
- Stock index futures
  - Settled in cash