The Economics of Money, Banking, and Financial Markets

FN 211 Financial Markets

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Derivatives Market: Forward and Futures Contracts

Financial Derivatives

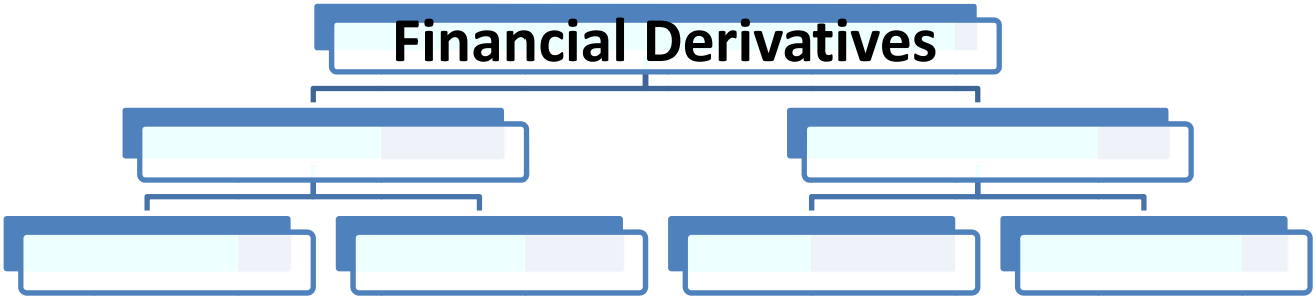
- Financial instrument with a return that is obtained from or "derived" from the return of another underlying financial instrument

Forward Commitment

- Forward commitment is an agreement between two parties in which one party agrees to buy and the other agrees to sell an asset at a future date at a price agreed on today
- Basic three types of forward commitments: forward contracts, futures contracts, and swaps

Contingent Claim

- Contingent claim is a derivative contract with a payoff dependent on the occurrence of a future event
- Primary types of contingent claims are options, but other types involve variations of options, often combined with other financial instruments or derivatives



- Standard options on assets
- Interest rate options
- Warrants
- Options on futures
- Callable bonds
- Convertible bonds

- Standard options on assets
- Interest rate options
- Callable bonds
- Convertible bonds
- Exotic options
- Warrants
- Asset-backed securities (with prepayment options)

- Forward contracts
- Swaps

	Organised Exchange	Over-the-Counter (OTC)
Forwards		
Futures		
Options		
Swaps		

Exchange-Traded Derivatives

- Exchange-traded derivatives are created, authorised, and traded on a derivatives exchange, an organised facility for trading derivatives
- Exchange-traded derivatives are standardised instruments with respect to certain terms and conditions of the contract
- Exchange-traded derivatives are traded in accordance with rules and specifications prescribed by the derivatives exchange and are usually subject to governmental regulation
- Exchange-traded derivatives are guaranteed by the exchange against default risk

Over-the-Counter Derivatives

- Over-the-counter derivatives are transactions created by any two parties off of a derivatives exchange
- Parties set all of their own terms and conditions, and each assumes the credit risk of the other party

Purposes of Derivative Markets

- To hedge risks (Risk management)
- To discover price (Price discovery)
- To make market more efficient / more complete
- To speculate (take a view on the future direction of the market)
- To change the nature of a liability
- To change the nature of an investment without incurring the costs of selling one portfolio and buying another
- To lock in an arbitrage profit

Example: Arbitrage

Consider the following three securities. Let us assume that at one period in the future the market will move either up or down. This movement in the market produces the following payoffs for the three securities.

Security	Current price	Payoff when market moves down	Payoff when market moves up
A	$35	$25	$50
B	$30	$15	$60
C	$40	$19	$56

A. Construct a portfolio consisting of securities A and B that replicates the payoffs on security C in both the up and down states subject to the constraint that the sum of the commitments to the two securities (A and B) is one. In other words, construct a synthetic share of security C. Assume that there are no restrictions associated with short selling any of the securities.
B. How much does it cost to construct a synthetic share of security C? Compare this cost with the market price of security C. Which security is cheaper?
C. Explain the transactions necessary to engage in riskless arbitrage.
D. Redo parts A. to C. by using security B and C to create synthetic security A.

Forward / Future Contract

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Forwards

- Forward contract is agreement between two parties in which one party, the buyer (long position), agrees to buy from the other party, the seller (short position), an underlying asset or other derivatives, at a future date at a price established at the start of the contract

Futures

- Agreements similar to forward but feature formalised and standardised characteristics

Types of Forward Contracts

Equity Forwards

- Contracts call for the buy / sell of an individual stock, a stock portfolio, or a stock index at the later date

Bond and Interest Rate Forward Contracts

- Forward contracts on interest rates, contracts call for the buy / sell of bonds

Currency Forward Contracts

- Contracts call for the buy / sell of foreign currency

Other Types of Forward Contracts

- Commodity forwards
- Oil, precious metal, energy, or weather

Delivery and Settlement of a Forward Contract

- Deliverable forward contract stipulates that the long will pay the agreed-upon price to the short, who in turn will deliver the underlying asset to the long, a process called ***delivery***
- ***Cash settlement*** permits the long and short to pay the net cash value of the position on the delivery date
- NDFs, *non-deliverable forwards*: cash-settled forward contracts

Example:

CASE I: Naked Position

Stock Futures Contract

Time	29th December 2009
Price	76.75 baht/share
Quality	KBANK
Quantity	1,000 shares

CASE II: Hedging Position

Stock Futures Contracts + Stock Position

KBANK shares	10,000 shares

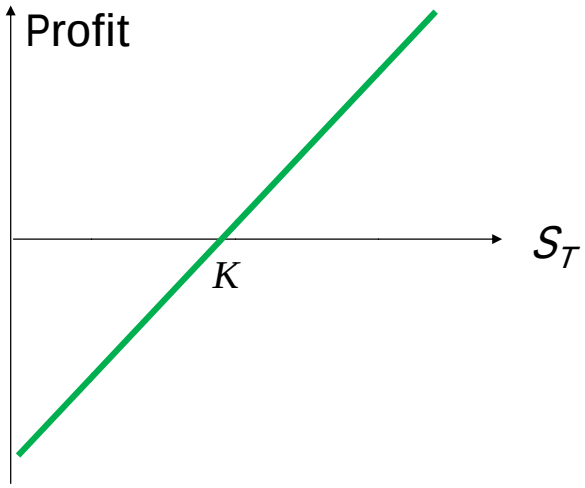
TFEX: Stock Futures

Daily Market Report

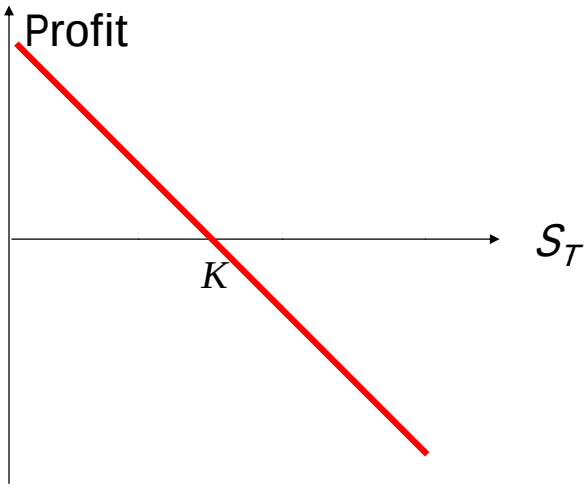
Snapshot 15 Sep 2009 16:59:54

Underlying Instrument	Last	Chg	%Chg	High	Low	Volume ('000 Shares)	Value (M.Baht)
SET50 Index	503.92	6.96	1.40	504.32	497.45	1,322,092	15,306.11
ADVANC	96.00	-0.50	-0.52	96.75	95.50	4,762	457.46
BANPU	414.00	2.00	0.49	416.00	410.00	1,316	544.99
BAY	18.30	0.20	1.10	18.30	18.00	6,667	121.37
BBL	116.50	0.50	0.43	117.00	115.50	2,093	243.74
ITD	3.38	0.24	7.64	3.40	3.18	280,242	925.54
KBANK	76.75	-0.25	-0.32	77.50	75.75	10,139	777.31
KTB	9.30	0.25	2.76	9.30	9.05	38,685	356.26
LH	6.20	0.10	1.64	6.25	6.10	18,216	112.35
PTT	265.00	8.00	3.11	266.00	258.00	6,215	1,628.51
PTTEP	145.00	1.50	1.05	145.50	143.00	7,244	1,044.13
QH	2.16	0.02	0.93	2.18	2.12	51,366	110.55
SCB	79.75	-1.25	-1.54	81.25	78.75	14,602	1,164.48
SCC	219.00	4.00	1.86	219.00	213.00	1,765	381.15
TTA	26.00	0.75	2.97	26.00	24.80	37,547	955.10

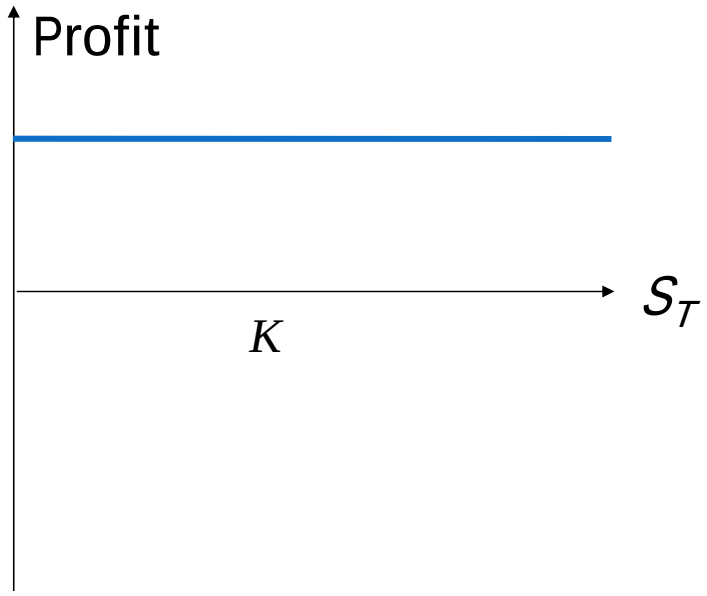
Profit from a Long Forward Position



Profit from a Short Forward Position



Profit from a Forward Hedge Position



Example: Hedging

An American expects to travel to Canada in September

Currency Futures Contract (CME)	
Time	**Third Wednesday of September**
Price	**US$ 0.55/C$**
Quality	**Canadian dollar**
Quantity	**C$100,000**

Example

It is August 10 and Farmer John is making final estimates of this year's wheat crop. His production is turning out to be much better than expected. This causes concern because if his production is better than expected, other farmers must be experiencing the same situation. The current spot price is $2.25 per bushel, and the September wheat futures (5,000 bushels per contract) price is $2.52 per bushel. At the current spot price, Farmer John would just break even with his anticipated 60 thousand bushels. His wheat will not be ready to harvest until September.

A. What can Farmer John do to ensure his profitability? Is this a long or a short hedge? Why?
B. At harvest time in September, Farmer John's concerns are realized in that the cash price has dropped to $1.70 per bushel. Compute Farmer John's net wealth change due to the drop in corn prices, assuming he hedged his anticipated production and his final yield was 60,000 bushels.
C. Suppose Farmer John's production turned out to be only 50,000 bushels. Compute his net wealth change.

Forward / Future Contract

Futures Contract

- Futures contracts are highly uniform and well-specified commitments for a carefully described good (quantity and quality of the good) to be delivered at a certain time and place (acceptable delivery date) and in a certain manner (method for closing the contract) and the permissible price fluctuations are specified (minimum and maximum daily price changes).

Futures Contract Standardised Terms

1. Quantity
2. Quality
3. Expiration months
4. Delivery terms
5. Delivery dates
6. Minimum price fluctuation
7. Daily price limits
8. Trading days and hours

Foreign Currencies	Agricultural	Metals and Energy	Interest Rate Futures	Equity Indexes
British pound	Corn	Copper	Eurodollars	S&P 500 index
Canadian dollar	Oats	Aluminum	Euroyen	Dow Jones Industrials
Japanese yen	Soybeans	Gold	Euro-denominated bond	S&P Midcap 400
Euro	Soybean meal	Platinum	Euroswiss	NASDAQ 100
Swiss franc	Soybean oil	Palladium	Sterling	NYSE index
Australian dollar	Wheat	Silver	British government bond	Russell 2000 index
Mexican peso	Barley	Crude oil	German government bond	Nikkei 225 (Japanese)
Brazilian real	Flaxseed	Heating oil	Italian government bond	FTSE index (British)
	Canola	Gas oil	Canadian govern-ment bond	CAC-40 (French)
	Rye	Natural gas	Treasury bonds	DAX-30 (German)
	Cattle	Gasoline	Treasury notes	All ordinary (Australian)
	Hogs	Propane	Treasury bills	Toronto 35 (Canadian)
	Pork bellies	Commodity index	LIBOR	Dow Jones Euro STOXX 50
	Cocoa	Electricity	EURIBOR	Industry indexes, e.g.,
	Coffee	Weather	Euroswiss	Banking
	Cotton		Municipal bond index	Telecom
	Milk		Federal funds rate	Utilities
	Orange juice		Bankers' acceptance	Health care
	Sugar		Interest rate swaps	Technology
	Lumber			
	Rice			

TABLE 22.1

Sample of futures contracts

KEY TO EXCHANGES: **CBT:** Chicago Board of Trade; **CME:** Chicago Mercantile Exchange; **CMX:** Comex; **KC:** Kansas City Board of Trade; **MPLS:** Minneapolis Grain Exchange; **ICE-US:** ICE Futures U.S. **NYM:** New York Mercantile Exchange, or Nymex

Metal & Petroleum Futures

	Open	Contract High	hi	lo	Low	Settle	Chg	Open interest
Copper-High (CMX)-25,000 lbs.; cents per lb.								
Jan	305.00	305.00			301.85	**303.05**	-2.70	2,196
March	307.35	309.45			302.20	**304.10**	-3.10	51,193
Gold (CMX)-100 troy oz.; $ per troy oz.								
Jan	843.20	843.20	▲		843.20	**834.90**	-4.70	81
Feb	843.20	847.40			833.00	**838.00**	-4.70	284,263
April	852.30	853.20			840.20	**844.50**	-4.80	69,051
June	857.90	858.90			845.50	**850.40**	-4.90	56,471
Aug	863.30	863.30			856.00	**855.90**	-5.00	31,030
Dec	871.90	873.00			861.00	**865.90**	-5.10	29,080
Platinum (NYM)-50 troy oz.; $ per troy oz.								
Jan	1539.00	1539.00			1513.00	**1528.40**	-12.10	504
April	1540.00	1542.90			1514.10	**1525.40**	-14.10	16,644
Silver (CMX)-5,000 troy oz.; cnts per troy oz.								
Jan	...	...			...	**1479.7**	2.7	331
March	1489.5	1508.0			1481.0	**1492.0**	2.5	71,349
Crude Oil, Light Sweet (NYM)-1,000 bbls.; $ per bbl.								
Feb	96.12	96.78			94.73	**95.98**	-0.02	319,543
March	96.00	96.50			94.55	**95.78**	0.02	166,417
April	95.50	95.90			94.12	**95.24**	0.09	67,090
June	94.17	94.71			93.11	**94.03**	0.14	77,742
Dec	91.00	91.70			90.16	**90.97**	0.11	172,840
Dec'09	87.03	87.35			86.00	**86.61**	-0.11	69,686
Heating Oil No. 2 (NYM)-42,000 gal.; $ per gal.								
Jan	2.6435	2.6770			2.6284	**2.6444**	.0074	8,187
Feb	2.6316	2.6704			2.6224	**2.6494**	.0206	86,285
Gasoline-NY RBOB (NYM)-42,000 gal.; $ per gal.								
Jan	2.4776	2.4985			2.4580	**2.4758**	.0161	4,409
Feb	2.4785	2.5165			2.4723	**2.4908**	.0126	64,835
Natural Gas (NYM)-10,000 MMBtu.; $ per MMBtu.								
Feb	7.349	7.540			7.283	**7.483**	.097	115,717
March	7.350	7.569			7.300	**7.521**	.110	123,381
April	7.371	7.580			7.334	**7.546**	.110	58,408
May	7.399	7.639			7.399	**7.613**	.109	47,840
Oct	7.875	8.015			7.874	**7.986**	.097	41,931
Jan'09	8.945	8.985			8.940	**9.021**	.060	40,818

Agriculture Futures

	Open	Contract High	hi	lo	Low	Settle	Chg	Open interest
Corn (CBT)-5,000 bu.; cents per bu.								
March	450.00	457.00	▲		447.75	**455.50**	3.50	597,895
Dec	470.25	475.00			469.50	**473.50**	.50	281,042
Ethanol (CBT)-29,000 gal.; $ per gal.								
Jan	2.350	2.370			2.350	**2.368**	.033	108
Oats (CBT)-5,000 bu.; cents per bu.								
March	300.00	308.00			299.25	**306.75**	3.75	9,595
May	310.50	314.50			309.50	**312.00**	1.00	875
Soybeans (CBT)-5,000 bu.; cents per bu.								
Jan	1197.00	1202.00			1180.75	**1199.00**	-8.75	23,303
March	1210.50	1218.75			1197.00	**1214.25**	-8.75	280,180
Soybean Meal (CBT)-100 tons; $ per ton.								
Jan	335.00	335.00			321.00	**331.50**	5.50	13,218
March	333.40	337.70			327.80	**336.70**	3.20	107,885
Soybean Oil (CBT)-60,000 lbs.; cents per lb.								
Jan	49.51	49.51	▲		48.29	**48.85**	.02	15,305
March	49.32	49.70			49.16	**49.63**	-.04	167,262
Rough Rice (CBT)-2,000 cwt.; cents per cwt.								
Jan	1356.00	1364.00			1355.00	**1355.00**	-10.00	1,046
March	1396.00	1400.00			1385.00	**1386.50**	-10.50	14,071
Wheat (CBT)-5,000 bu.; cents per bu.								
March	883.00	900.00			877.25	**885.00**	...	203,756
July	778.50	780.00			769.00	**775.50**	-2.50	98,801
Wheat (KC)-5,000 bu.; cents per bu.								
March	914.00	920.00			890.00	**913.50**	-.50	69,712
July	812.00	822.00			800.00	**820.25**	6.25	29,994
Wheat (MPLS)-5,000 bu.; cents per bu.								
March	1029.00	1044.00			1024.00	**1036.25**	6.25	37,129
May	995.00	1006.00			990.00	**1006.00**	12.00	10,268
Cattle-Feeder (CME)-50,000 lbs.; cents per lb.								
Jan	104.550	105.650			104.500	**105.100**	.775	6,027
March	106.000	107.750			105.850	**107.100**	.750	15,503
Cattle-Live (CME)-40,000 lbs.; cents per lb.								
Dec	93.600	96.250			93.500	**96.250**	2.750	132
Feb'08	96.225	96.750			95.700	**96.175**	.125	117,393
Hogs-Lean (CME)-40,000 lbs.; cents per lb.								
Feb	57.200	58.100		▼	57.000	**57.875**	.575	94,841
April	63.150	64.050			62.950	**63.750**	.400	50,525
Pork Bellies (CME)-40,000 lbs.; cents per lb.								
Feb	84.500	87.000			84.100	**85.975**	1.200	1,200
March	85.000	85.000			85.000	**85.500**	.700	358

	Open	Contract High	hi	lo	Low	Settle	Chg	Open interest
Coffee (ICE-US)-37,500 lbs.; cents per lb.								
March	133.20	137.00			133.10	**136.20**	3.10	110,413
May	135.85	139.35			135.85	**138.75**	3.10	24,312
Sugar-World (ICE-US)-112,000 lbs.; cents per lb.								
March	10.93	11.02			10.79	**10.82**	-.12	462,625
May	11.24	11.29			11.11	**11.12**	-.13	118,502
Sugar-Domestic (ICE-US)-112,000 lbs.; cents per lb.								
March	...	...			...	**20.48**	-.01	3,527
Cotton (ICE-US)-50,000 lbs.; cents per lb.								
March	67.89	68.10			67.35	**68.01**	.12	133,258
Dec	75.25	75.35			74.65	**75.21**	.01	43,843
Orange Juice (ICE-US)-15,000 lbs.; cents per lb.								
Jan	142.80	150.25			140.50	**143.60**	.60	1,184
March	144.35	153.00			142.40	**144.80**	.45	18,650

Interest Rate Futures

	Open	Contract High	hi	lo	Low	Settle	Chg	Open interest
Treasury Bonds (CBT)-$100,000; pts 32nds of 100%								
March	115-27	116-23			115-25	**116-12**	22	918,180
June	115-16	116-09			115-16	**115-24**	22	2,437
Treasury Notes (CBT)-$100,000; pts 32nds of 100%								
March	113-005	113-180			112-310	**113-125**	15.5	2,116,449
June	112-070	112-070			112-070	**112-225**	16.0	1,322
5 Yr. Treasury Notes (CBT)-$100,000; pts 32nds of 100%								
Dec	110-240	110-240			110-135	**110-145**	8.0	15,471
March'08	110-020	110-120			110-005	**110-090**	10.5	1,760,240
2 Yr. Treasury Notes (CBT)-$200,000; pts 32nds of 100%								
Dec	104-300	104-300			104-300	**105-000**	2.2	9,580
March'08	105-000	105-052			105-000	**105-040**	5.0	978,735
30 Day Federal Funds (CBT)-$5,000,000; 100 - daily avg.								
Dec	95.745	95.760			95.745	**95.755**	.015	119,194
Jan'08	95.835	95.845	▲		95.825	**95.840**	.010	141,448
1 Month Libor (CME)-$3,000,000; pts of 100%								
Jan	95.5300	95.5400			95.5300	**95.5350**	.0125	21,284
Feb	95.6825	95.7000	▲		95.6725	**95.6825**	.0075	9,411
Eurodollar (CME)-$1,000,000; pts of 100%								
Jan	95.4025	95.4250			95.3975	**95.4050**	.0075	83,562
March	95.7450	95.7800			95.7300	**95.7650**	.0350	1,440,884
June	96.2150	96.2850			96.2050	**96.2550**	.0600	1,446,031
Dec	96.5800	96.6600			96.5700	**96.6300**	.0650	1,493,832

Currency Futures

	Open	Contract High	hi	lo	Low	Settle	Chg	Open interest
Japanese Yen (CME)-¥12,500,000; $ per 100¥								
March	.8965	.9048			.8945	**.9013**	.0077	159,034
June	.9100	.9124		▼	.9100	**.9095**	.0077	24,489
Canadian Dollar (CME)-CAD 100,000; $ per CAD								
March	1.0210	1.0247			1.0056	**1.0099**	-.0101	76,435
June	1.0199	1.0220			1.0064	**1.0096**	-.0100	3,711
British Pound (CME)-£62,500; $ per £								
March	1.9911	2.0061			1.9768	**1.9785**	-.0100	78,699
June	1.9801	1.9999			1.9740	**1.9730**	-.0100	245
Swiss Franc (CME)-CHF 125,000; $ per CHF								
March	.8910	.8947			.8832	**.8838**	-.0078	62,101
June	.8959	.8973			.8885	**.8874**	-.0078	53
Australian Dollar (CME)-AUD 100,000; $ per AUD								
March	.8724	.8788			.8711	**.8726**	.0033	58,255
June	.8735	.8735			.8675	**.8665**	.0033	434
Mexican Peso (CME)-MXN 500,000; $ per 10MXN								
Jan	...	...			...	**.91500**	-.00175	3
March	.91125	.91250			.91025	**.91075**	-.00175	88,117
Euro (CME)-€125,000; $ per €								
March	1.4739	1.4759			1.4580	**1.4590**	-.0136	170,740
June	1.4735	1.4749			1.4580	**1.4581**	-.0141	1,251

Index Futures

	Open	Contract High	hi	lo	Low	Settle	Chg	Open interest
DJ Industrial Average (CBT)-$10 x index								
March	13424	13452			13310	**13328**	-99	24,590
June	13425	13425			13390	**13404**	-99	37
Mini DJ Industrial Average (CBT)-$5 x index								
March	13423	13454			13301	**13328**	-99	67,841
June	13370	13435			13370	**13404**	-99	3
S&P 500 Index (CME)-$250 x index								
March	1485.20	1488.90			1472.00	**1477.20**	-8.30	514,454
June	1490.50	1496.00			1481.40	**1486.00**	-8.40	6,604
Mini S&P 500 (CME)-$50 x index								
March	1485.25	1489.00			1471.00	**1477.25**	-8.25	1,751,604
June	1493.50	1497.25			1480.50	**1486.00**	-8.50	5,119
Nasdaq 100 (CME)-$100 x index								
March	2125.50	2127.50			2101.00	**2104.75**	-20.25	38,600

Source: Reuters

FIGURE 22.1 Futures listings

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CBOT Wheat Futures Contract

Heading	Contract Specification
Quantity:	5,000 bushels per contract.
Quality:	No. 2 Soft Red, No. 2 Hard Red Winter No. 2 Dark Northern Spring, or No. 1 Northern Spring.
Expiration:	July, September, December, March, & May.
Delivery Terms:	Wheat must be delivered at a "regular" or approved warehouse (e.g., warehouses located Chicago Switching District).
Delivery:	Any business days in the delivery month.
Payment:	Seller received payment and delivers warehouse receipt to the buyer.
Price Fluctuation	1/4 cent per bushel.
Daily Price Limit:	Trading price on a given day cannot differ from the preceding day's closing price by more than 30 cents/bushel ($1,500/contract).
Trading Days:	Wheat trades from 9:30 a.m. to 1:15 p.m. Chicago time.

Basic Differences between Forward and Futures Contracts

	Forward contract	Future contract
Trading	Forward contracts are traded by telephone or telex.	Futures contracts are traded in a competitive arena.
Regulation	Forward market is self-regulating.	Futures market is regulated by the Exchange.
Frequency of Delivery	More than 90% of all forward contracts are settled by actual delivery.	By contract, less than 1% of futures contracts are settled by delivery.
Size of Contract	Forward market are individually tailored and tend to be much larger than the standardised future contracts	Futures contracts are standardised in terms of currency amount.
Delivery Date	Banks offer forward contracts for delivery on any date.	Futures contracts are available for delivery on only a few specified dates a year.
Settlement	Forward market settlement occurs on the date agreed on between the bank and the customer.	Futures contract settlements are made daily via the Exchange's Clearing House; gains on position values may be withdrawn and losses are collected daily. (Marked-to-Market)

	Forward contract	Future contract
Transaction Costs	Costs of forward contracts are based on bid-ask spread.	Futures contracts entail brokerage fees for buy and sell orders.
Quotes (Currency)	Forward prices generally are quoted in European terms.	Futures contracts are quoted in American terms.
Margin	Margins are not required in the forward market.	Margins are required of all participants in the futures market.
Credit Risk	Credit risk is borne by each party to a forward contract. Credit limits must therefore be set for each customer.	The Exchange's Clearing House becomes the opposite side to each futures contract, thereby reducing credit risk substantially.

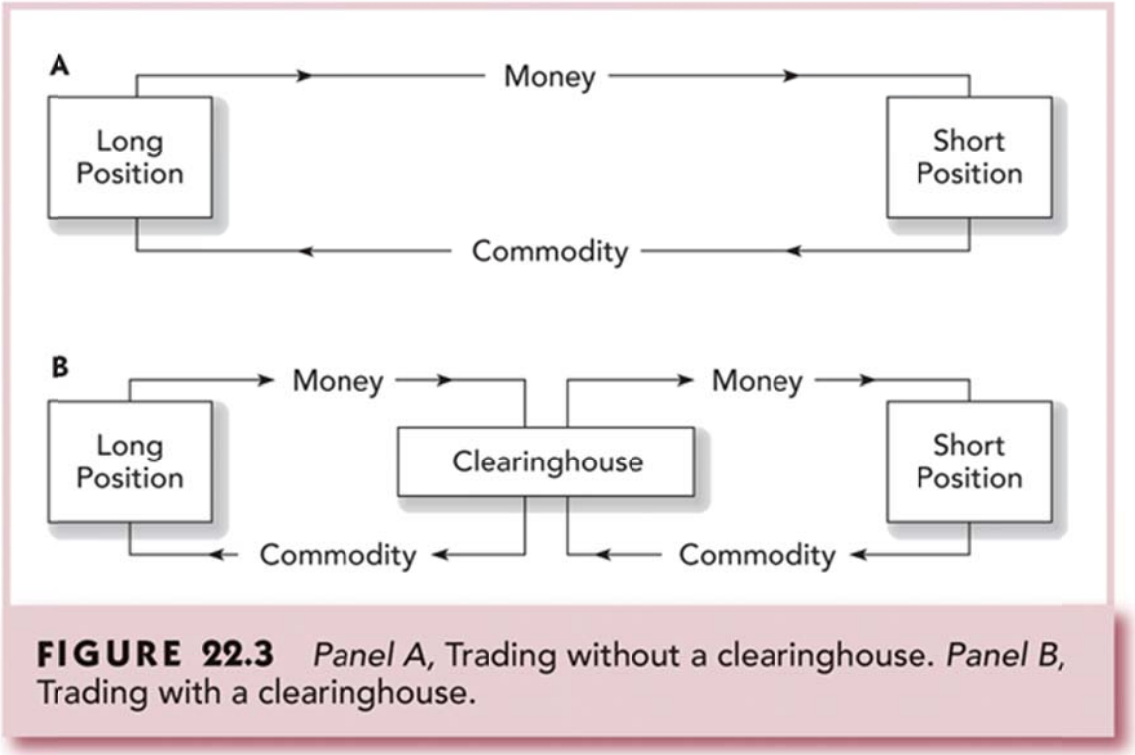

FIGURE 22.3 *Panel A,* Trading without a clearinghouse. *Panel B,* Trading with a clearinghouse.

Trading Mechanics

- **Clearinghouse : acts as a party to all buyers and sellers**
  - Obligated to deliver or supply delivery
- **Closing out positions**
  - Reversing the trade
  - Take or make delivery
  - Most trades are reversed and do not involve actual delivery
- **Open interest: the total number of contracts outstanding**
  - equal to number of long positions or number of short positions

Example: Open Interest

Time	*Action*	*Open Interest*
t = 0	Trading opens for the futures contracts.	
t = 1	Trader A buys and Trader B sells 1 futures contract.	
t = 2	Trader C buys and trader D sells 3 futures contracts.	
t = 3	Trader A sells and Trader D buys 1 futures contracts. (Trader A has offset 1 futures contract and is out of the market. Trader D has offset 1 futures contract and is now short 2 contracts.)	
t = 4	Trader C sells and Trader E buys 1 futures contract.	

Ending Positions	Long Position	Short Position
Trader A		
Trader B		
Trader C		
Trader D		
Trader E		
All traders		

Margin and Daily Settlement

- **Margin**
  - A good-faith deposit (or performance bond) made by a prospective trader with a broker. Margin can be posted in cash, bank letter of credit or short-term U.S. Treasury instruments.
- **Daily Settlement**
  - Process by which traders are required to realize any losses in cash immediately (marked-to-the-market). The losses are usually deducted from the margin deposit.

TYPES OF MARGIN

There are 3 types of margin:

1. **Initial Margin (Initial Performance Bond)**
   Deposit that a trader must make before trading any futures.
2. **Maintenance Margin (Maintenance Performance Bond)**
   When margin reaches a minimum maintenance level, the trader is required to bring the margin back to its initial level. The maintenance margin is generally about 75% of the initial margin.
3. **Variation Margin (Variation Performance Bond)**
   Additional margin required to bring an account up to the required level.
   Process: Margin Call (Performance Bond Call)

Closing a Futures Position: Delivery or Cash Settlement

- **Delivery**
  - Most commodity futures contracts are written for completion of the futures contract through the physical delivery of a particular good.
- **Cash settlement**
  - Most financial futures contracts allow completion through cash settlement.
  - In cash settlement, traders make payments at the expiration of the contract to settle any gains or losses, instead of making physical delivery.

DAILY SETTLEMENT / MARKING-TO-MARKET

Example 1
Future price is $100
Maturity: 6 days
Initial margin = $5.00
Maintenance margin requirement = $3

Day	Future Price
Day 1	99.20
Day 2	96.00
Day 3	101.00
Day 4	103.50
Day 5	103.00
Day 6	104.00

Mark-to-market for: Holder of long position of 10 contracts

Day	***Daily Settlement***	***Margin Call***	***Margin Account***
Day 1			
Day 2			
Day 3			
Day 4			
Day 5			
Day 6			
	Profit/Loss =		

Mark-to-market for: Holder of short position of 10 contracts

Day	***Daily Settlement***	***Margin Call***	***Margin Account***
Day 1			
Day 2			
Day 3			
Day 4			
Day 5			
Day 6			
	Profit/Loss =		

Example 2
Future price is $82
Maturity: 6 days
Initial margin = $5.00
Maintenance margin requirement = $2

Day	Future Price
Day 1	84.00
Day 2	78.00
Day 3	73.00
Day 4	79.00
Day 5	82.00
Day 6	84.00

Mark-to-market for: Holder of long position of 20 contracts

Day	***Daily Settlement***	***Margin Call***	***Margin Account***
Day 1			
Day 2			
Day 3			
Day 4			
Day 5			
Day 6			
	Profit/Loss =		

Mark-to-market for: Holder of short position of 20 contracts

Day	***Daily Settlement***	***Margin Call***	***Margin Account***
Day 1			
Day 2			
Day 3			
Day 4			
Day 5			
Day 6			
	Profit/Loss =		

Example 3

- On Monday Morning, you short one CME yen futures contract containing ¥12,500,000 at a price of $0.009433.
- Suppose the broker required a performance bond of $4,590 and a maintenance performance bond of $3,400.
- The settlement prices for Monday through Thursday are $0.009542, $0.009581, $0.009375, and $0.009369, respectively.
- On Friday, you close out the contract at a price of $0.009394.
- Calculate the daily cash flows on your account.
- Describe any performance bond calls on your account. What is your cash balance with your broker as of the close of business on Friday? Assume that you begin with an initial balance of $4,590 and that your round-trip commission was $27.

Day	***Daily Settlement***	***Margin Call***	***Margin Account***
Mon			
Tue			
Wed			
Thu			
Fri			
	Profit/Loss =		