Futures markets

Futures and Forwards

- Forward - an agreement calling for a future delivery of an asset at an agreed-upon price
- Futures - similar to forward but feature formalized and standardized characteristics
- Key difference in futures
  - Secondary trading - liquidity
  - Marked to market
  - Standardized contract units
  - Clearinghouse warrants performance

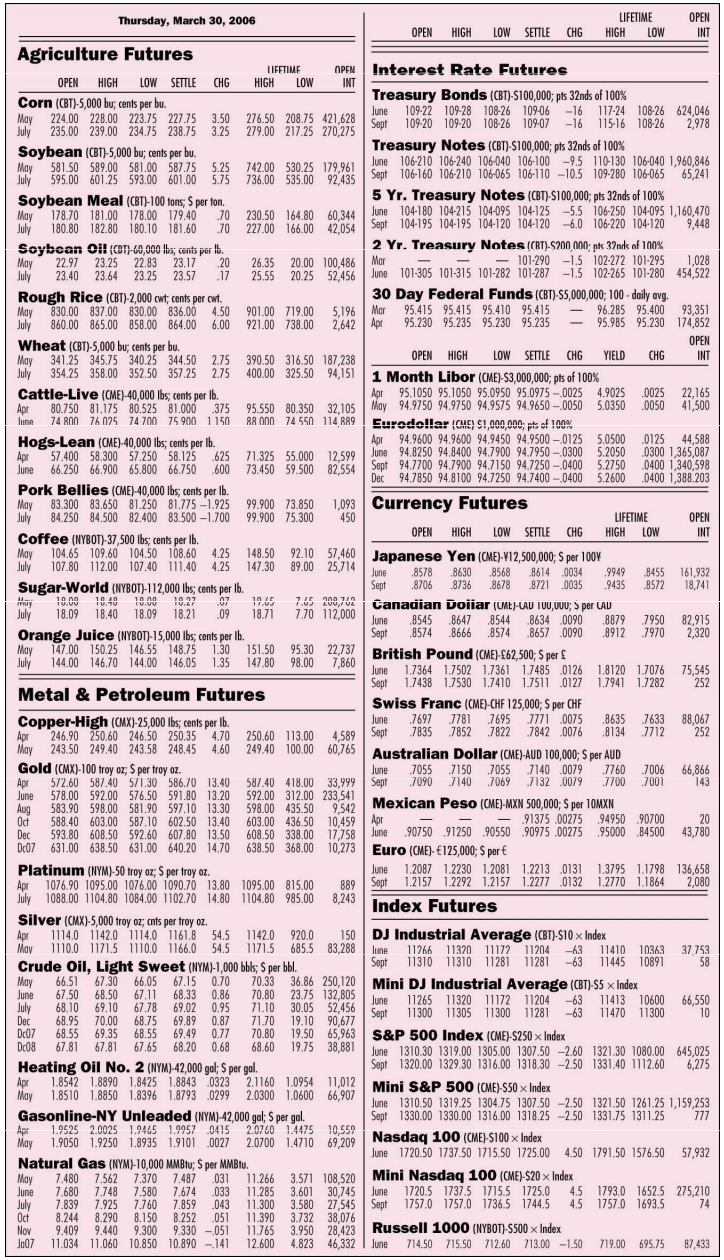
Key Terms for Futures Contracts

- Futures price - agreed-upon price at maturity
- Long position - agree to purchase
- Short position - agree to sell
- Profits on positions at maturity

  Long = spot minus original futures price

  Short = original futures price minus spot

Figure 22.1 Futures Listings



Thursday, March 30, 2006

Agriculture Futures

	OPEN	HIGH	LOW	SETTLE	CHG	LIFETIME HIGH	LIFETIME LOW	OPEN INT
Corn (CBT)-5,000 bu; cents per bu.								
May	224.00	228.00	223.75	227.75	3.50	276.50	208.75	421,628
July	235.00	239.00	234.75	238.75	3.25	279.00	217.25	270,275
Soybean (CBT)-5,000 bu; cents per bu.								
May	581.50	589.00	581.00	587.75	5.25	742.00	530.25	179,961
July	595.00	601.25	593.00	601.00	5.75	736.00	535.00	92,435
Soybean Meal (CBT)-100 tons; $ per ton.								
May	178.70	181.00	178.00	179.40	.70	230.50	164.80	60,344
July	180.80	182.80	180.10	181.60	.70	227.00	166.00	42,054
Soybean Oil (CBT)-60,000 lbs; cents per lb.								
May	22.97	23.25	22.83	23.17	.20	26.35	20.00	100,486
July	23.40	23.64	23.25	23.57	.17	25.55	20.25	52,456
Rough Rice (CBT)-2,000 cwt; cents per cwt.								
May	830.00	837.00	830.00	836.00	4.50	901.00	719.00	5,196
July	860.00	865.00	858.00	864.00	6.00	921.00	738.00	2,642
Wheat (CBT)-5,000 bu; cents per bu.								
May	341.25	345.75	340.25	344.50	2.75	390.50	316.50	187,238
July	354.25	358.00	352.50	357.25	2.75	400.00	325.50	94,151
Cattle-Live (CME)-40,000 lbs; cents per lb.								
Apr	80.750	81.175	80.525	81.000	.375	95.550	80.350	32,105
June	74.800	76.025	74.700	75.900	1.150	88.000	74.550	114,889
Hogs-Lean (CME)-40,000 lbs; cents per lb.								
Apr	57.400	58.300	57.250	58.125	.625	71.325	55.000	12,599
June	66.250	66.900	65.800	66.750	.600	73.450	59.500	82,554
Pork Bellies (CME)-40,000 lbs; cents per lb.								
May	83.300	83.650	81.250	81.775	–1.925	99.900	73.850	1,093
July	84.250	84.500	82.400	83.500	–1.700	99.900	75.300	450
Coffee (NYBOT)-37,500 lbs; cents per lb.								
May	104.65	109.60	104.50	108.60	4.25	148.50	92.10	57,460
July	107.80	112.00	107.40	111.40	4.25	147.30	89.00	25,714
Sugar-World (NYBOT)-112,000 lbs; cents per lb.								
May	18.08	18.40	18.08	18.27	.07	19.65	7.65	208,762
July	18.09	18.40	18.09	18.21	.09	18.71	7.70	112,000
Orange Juice (NYBOT)-15,000 lbs; cents per lb.								
May	147.00	150.25	146.55	148.75	1.30	151.50	95.30	22,737
July	144.00	146.70	144.00	146.05	1.35	147.80	98.00	7,860

Metal & Petroleum Futures

	OPEN	HIGH	LOW	SETTLE	CHG	LIFETIME HIGH	LIFETIME LOW	OPEN INT
Copper-High (CMX)-25,000 lbs; cents per lb.								
Apr	246.90	250.60	246.50	250.35	4.70	250.60	113.00	4,589
May	243.50	249.40	243.58	248.45	4.60	249.40	100.00	60,765
Gold (CMX)-100 troy oz; $ per troy oz.								
Apr	572.60	587.40	571.30	586.70	13.40	587.40	418.00	33,999
June	578.00	592.00	576.50	591.80	13.20	592.00	312.00	233,541
Aug	583.90	598.00	581.90	597.10	13.30	598.00	435.50	9,542
Oct	588.40	603.00	587.10	602.50	13.40	603.00	436.50	10,459
Dec	593.80	608.50	592.60	607.80	13.50	608.50	338.00	17,758
Dc07	631.00	638.50	631.00	640.20	14.70	638.50	368.00	10,273
Platinum (NYM)-50 troy oz; $ per troy oz.								
Apr	1076.90	1095.00	1076.00	1090.70	13.80	1095.00	815.00	889
July	1088.00	1104.80	1084.00	1102.70	14.80	1104.80	985.00	8,243
Silver (CMX)-5,000 troy oz; cnts per troy oz.								
Apr	1114.0	1142.0	1114.0	1161.8	54.5	1142.0	920.0	150
May	1110.0	1171.5	1110.0	1166.0	54.5	1171.5	685.5	83,288
Crude Oil, Light Sweet (NYM)-1,000 bbls; $ per bbl.								
May	66.51	67.30	66.05	67.15	0.70	70.33	36.86	250,120
June	67.50	68.50	67.11	68.33	0.86	70.80	23.75	132,805
July	68.10	69.10	67.78	69.02	0.95	71.10	30.05	52,456
Dec	68.95	70.00	68.75	69.89	0.87	71.70	19.10	90,677
Dc07	68.55	69.35	68.55	69.49	0.77	70.80	19.50	65,963
Dc08	67.81	67.81	67.65	68.20	0.68	68.60	19.75	38,881
Heating Oil No. 2 (NYM)-42,000 gal; $ per gal.								
Apr	1.8542	1.8890	1.8425	1.8843	.0323	2.1160	1.0954	11,012
May	1.8510	1.8850	1.8396	1.8793	.0299	2.0300	1.0600	66,907
Gasonline-NY Unleaded (NYM)-42,000 gal; $ per gal.								
Apr	1.9525	2.0025	1.9465	1.9957	.0415	2.0760	1.4475	10,559
May	1.9050	1.9250	1.8935	1.9101	.0027	2.0700	1.4710	69,209
Natural Gas (NYM)-10,000 MMBtu; $ per MMBtu.								
May	7.480	7.562	7.370	7.487	.031	11.266	3.571	108,520
June	7.680	7.748	7.580	7.674	.033	11.285	3.601	30,745
July	7.839	7.925	7.760	7.859	.043	11.300	3.580	27,545
Oct	8.244	8.290	8.150	8.252	.051	11.390	3.732	38,076
Nov	9.409	9.440	9.300	9.330	–.051	11.765	3.950	28,423
Ja07	11.034	11.060	10.850	10.890	–.141	12.600	4.823	46,332

Interest Rate Futures

	OPEN	HIGH	LOW	SETTLE	CHG	LIFETIME HIGH	LIFETIME LOW	OPEN INT
Treasury Bonds (CBT)-$100,000; pts 32nds of 100%								
June	109-22	109-28	108-26	109-06	–16	117-24	108-26	624,046
Sept	109-20	109-20	108-26	109-07	–16	115-16	108-26	2,978
Treasury Notes (CBT)-$100,000; pts 32nds of 100%								
June	106-210	106-240	106-040	106-100	–9.5	110-130	106-040	1,960,846
Sept	106-160	106-210	106-065	106-110	–10.5	109-280	106-065	65,241
5 Yr. Treasury Notes (CBT)-$100,000; pts 32nds of 100%								
June	104-180	104-215	104-095	104-125	–5.5	106-250	104-095	1,160,470
Sept	104-195	104-195	104-120	104-120	–6.0	106-220	104-120	9,448
2 Yr. Treasury Notes (CBT)-$200,000; pts 32nds of 100%								
Mar	—	—	—	101-290	–1.5	102-272	101-295	1,028
June	101-305	101-315	101-282	101-287	–1.5	102-265	101-280	454,522
30 Day Federal Funds (CBT)-$5,000,000; 100 - daily avg.								
Mar	95.415	95.415	95.410	95.415	—	96.285	95.400	93,351
Apr	95.230	95.235	95.230	95.235	—	95.985	95.230	174,852

	OPEN	HIGH	LOW	SETTLE	CHG	YIELD	CHG	OPEN INT
1 Month Libor (CME)-$3,000,000; pts of 100%								
Apr	95.1050	95.1050	95.0950	95.0975	–.0025	4.9025	.0025	22,165
May	94.9750	94.9750	94.9575	94.9650	–.0050	5.0350	.0050	41,500
Eurodollar (CME)-$1,000,000; pts of 100%								
Apr	94.9600	94.9600	94.9450	94.9500	–.0125	5.0500	.0125	44,588
June	94.8250	94.8400	94.7900	94.7950	–.0300	5.2050	.0300	1,365,087
Sept	94.7700	94.7900	94.7150	94.7250	–.0400	5.2750	.0400	1,340,598
Dec	94.7850	94.8100	94.7250	94.7400	–.0400	5.2600	.0400	1,388,203

Currency Futures

	OPEN	HIGH	LOW	SETTLE	CHG	LIFETIME HIGH	LIFETIME LOW	OPEN INT
Japanese Yen (CME)-¥12,500,000; $ per 100¥								
June	.8578	.8630	.8568	.8614	.0034	.9949	.8455	161,932
Sept	.8706	.8736	.8678	.8721	.0035	.9435	.8572	18,741
Canadian Dollar (CME)-CAD 100,000; $ per CAD								
June	.8545	.8647	.8544	.8634	.0090	.8879	.7950	82,915
Sept	.8574	.8666	.8574	.8657	.0090	.8912	.7970	2,320
British Pound (CME)-£62,500; $ per £								
June	1.7364	1.7502	1.7361	1.7485	.0126	1.8120	1.7076	75,545
Sept	1.7438	1.7530	1.7410	1.7511	.0127	1.7941	1.7282	252
Swiss Franc (CME)-CHF 125,000; $ per CHF								
June	.7697	.7781	.7695	.7771	.0075	.8635	.7633	88,067
Sept	.7835	.7852	.7822	.7842	.0076	.8134	.7712	252
Australian Dollar (CME)-AUD 100,000; $ per AUD								
June	.7055	.7150	.7055	.7140	.0079	.7760	.7006	66,866
Sept	.7090	.7140	.7069	.7132	.0079	.7700	.7001	143
Mexican Peso (CME)-MXN 500,000; $ per 10MXN								
Apr	—	—	—	.91375	.00275	.94950	.90700	20
June	.90750	.91250	.90550	.90975	.00275	.95000	.84500	43,780
Euro (CME)-€125,000; $ per €								
June	1.2087	1.2230	1.2081	1.2213	.0131	1.3795	1.1798	136,658
Sept	1.2157	1.2292	1.2157	1.2277	.0132	1.2770	1.1864	2,080

Index Futures

	OPEN	HIGH	LOW	SETTLE	CHG	LIFETIME HIGH	LIFETIME LOW	OPEN INT
DJ Industrial Average (CBT)-$10 × Index								
June	11266	11320	11172	11204	–63	11410	10363	37,753
Sept	11310	11310	11281	11281	–63	11445	10891	58
Mini DJ Industrial Average (CBT)-$5 × Index								
June	11265	11320	11172	11204	–63	11413	10600	66,550
Sept	11300	11305	11300	11281	–63	11470	11300	10
S&P 500 Index (CME)-$250 × Index								
June	1310.30	1319.00	1305.00	1307.50	–2.60	1321.30	1080.00	645,025
Sept	1320.00	1329.30	1316.00	1318.30	–2.50	1331.40	1112.60	6,275
Mini S&P 500 (CME)-$50 × Index								
June	1310.50	1319.25	1304.75	1307.50	–2.50	1321.50	1261.25	1,159,253
Sept	1330.00	1330.00	1316.00	1318.25	–2.50	1331.75	1311.25	777
Nasdaq 100 (CME)-$100 × Index								
June	1720.50	1737.50	1715.50	1725.00	4.50	1791.50	1576.50	57,932
Mini Nasdaq 100 (CME)-$20 × Index								
June	1720.5	1737.5	1715.5	1725.0	4.5	1793.0	1652.5	275,210
Sept	1757.0	1757.0	1736.5	1744.5	4.5	1757.0	1693.5	74
Russell 1000 (NYBOT)-$500 × Index								
June	714.50	715.50	712.60	713.00	–1.50	719.00	695.75	87,433

- The trader holding the long position
  - Purchase the good, profits from price increases
- Short position loss is equal to long position profit

- Profit to long = Spot price at maturity – Original future price
- Profit to short = Original future price – Spot price at maturity
- Zero sum game

Figure 22.2 Profits to Buyers and Sellers of Futures and Option Contracts

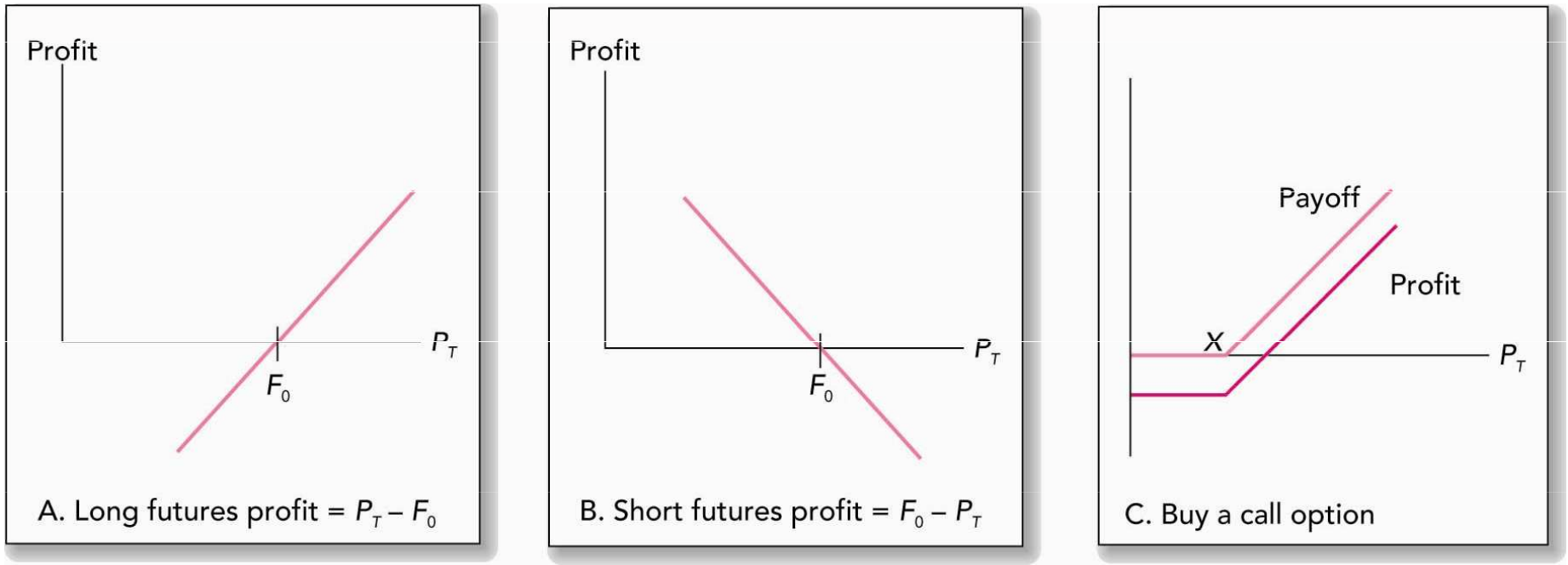
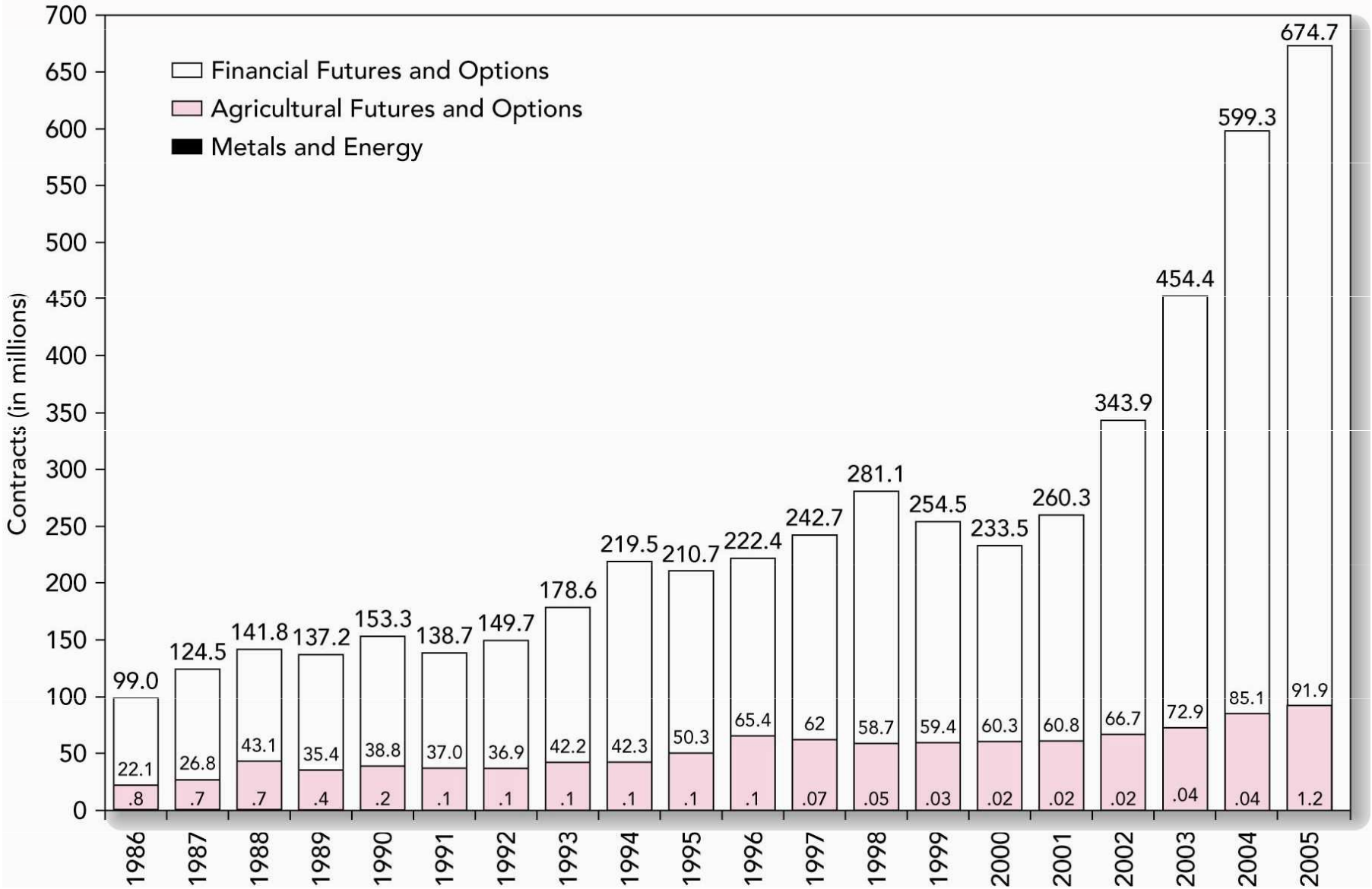


Figure 22.3 CBOT Trading Volume in Futures Contracts



Existing Contracts

- Variety of goods in 4 great categories
  - Agricultural commodities, metals and minerals, foreign currencies, financial futures
- Electricity or weather futures and option contracts
- Prediction market
- Forward market in foreign exchange

Table 22.1 Sample of Future Contracts

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 government 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			

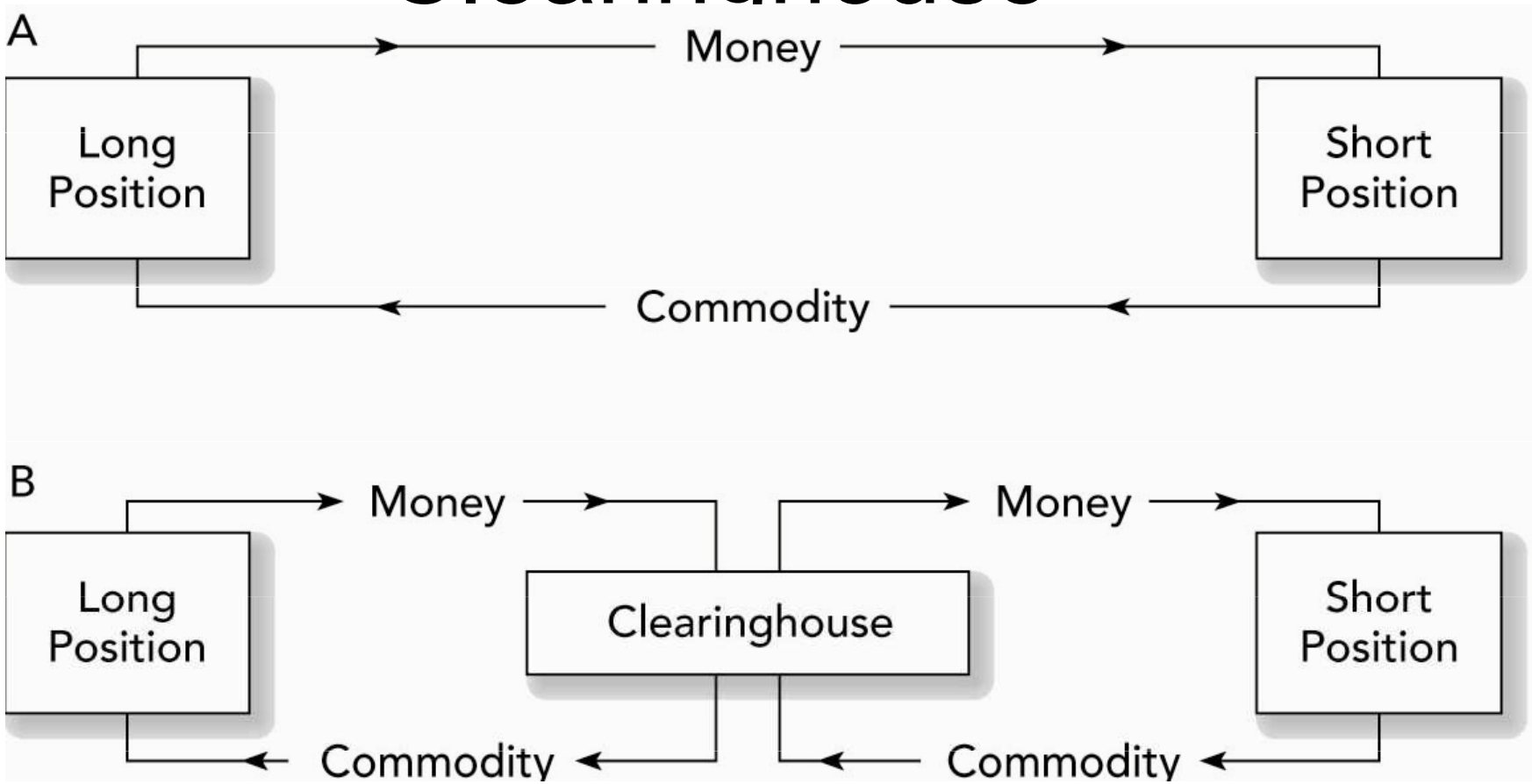
TABLE 22.1

Sample of futures contracts

Trading Mechanics

- Eurex
- Globex
- Clearinghouse - acts as a party to all buyers and sellers.
  - Obligated to deliver or supply delivery
    - Position = zero
- Closing out positions
  - Reversing the trade
  - Take or make delivery
  - Most trades are reversed and do not involve actual delivery
- Open Interest

Figure 22.4 A, Trading without a Clearinghouse. B, Trading with a Clearinghouse



Margin and Trading Arrangements

- Total profit or loss by long trader
  - Ft – F0
- Short trader earn
  - F0 - Ft
- Initial Margin - funds deposited to provide capital to absorb losses
- Marking to Market - each day the profits or losses from the new futures price are reflected in the account.
- Maintenance or variation margin - an established value below which a trader's margin may not fall.

Margin and Trading Arrangements

Margin call - when the maintenance margin is reached, broker will ask for additional margin funds

Convergence of Price - as maturity approaches the spot and futures price converge

Delivery - Actual commodity of a certain grade with a delivery location or for some contracts cash settlement

Cash Settlement – some contracts are settled in cash rather than delivery of the underlying assets

Assume the current futures price for silver for delivery 5 days from today is $14.10 per ounce. Suppose that over the next 5 days, the futures price evolves as follows:

Day	Futures Price
0 (today)	$14.10
1	14.20
2	14.25
3	14.18
4	14.18
5 (delivery)	14.21

The spot price of silver on the delivery date is $14.21: The convergence property implies that the price of silver in the spot market must equal the futures price on the delivery day.

The daily mark-to-market settlements for each contract held by the long position will be as follows:

Day	Profit (Loss) per Ounce × 5,000 Ounces/Contract = Daily Proceeds	
1	14.20 – 14.10 = .10	$500
2	14.25 – 14.20 = .05	250
3	14.18 – 14.25 = –.07	–350
4	14.18 – 14.18 = 0	0
5	14.21 – 14.18 = .03	150
		Sum = $550

The profit on Day 1 is the increase in the futures price from the previous day, or ($14.20 − $14.10) per ounce. Because each silver contract on the Commodity Exchange (CMX) calls for purchase and delivery of 5,000 ounces, the total profit per contract is 5,000 times $.10, or $500. On Day 3, when the futures price falls, the long position's margin account will be debited by $350. By Day 5, the sum of all daily proceeds is $550. This is exactly equal to 5,000 times the difference between the final futures price of $14.21 and original futures price of $14.10. Thus the sum of all the daily proceeds (per ounce of silver held long) equals $P_T - F_0$.

Cash versus Actual Delivery

- Most contracts call for delivery of an actual commodity
  - Quality can vary
    - Higher or lower grade commodities
- Some contracts call for cash settlement
  - St- F0

Trading Strategies

- Speculation -
  - short - believe price will fall
  - long - believe price will rise
- Hedging -
  - long hedge - protecting against a rise in price
  - short hedge - protecting against a fall in price

Futures market Strategies

- Hedging and speculations
- Speculators
  - Lower transaction costs
  - Leverage
    - Margin not value of the asset underlying the contract

EXAMPLE 22.4 Futures and Leverage

Suppose the initial margin requirement for the oil contract is 10%. At a current futures price of $97.15, and contract size of 1,000 barrels, this would require margin of $.10 \times 97.15 \times 1{,}000 = \$9{,}715$. A $2 jump in oil prices represents an increase of 2.06%, and results in a $2,000 gain on the contract for the long position. This is a percentage gain of 20.6% in the $9,715 posted as margin, precisely 10 times the percentage increase in the oil price. The 10-to-1 ratio of percentage changes reflects the leverage inherent in the futures position, because the contract was established with an initial margin of one-tenth the value of the underlying asset.

Futures market Strategies

- Hedgers
  - Insulate against price movements
- Not possible for some goods
  - Future contract is not traded
    - Cross hedging

EXAMPLE 22.5 Hedging with Oil Futures

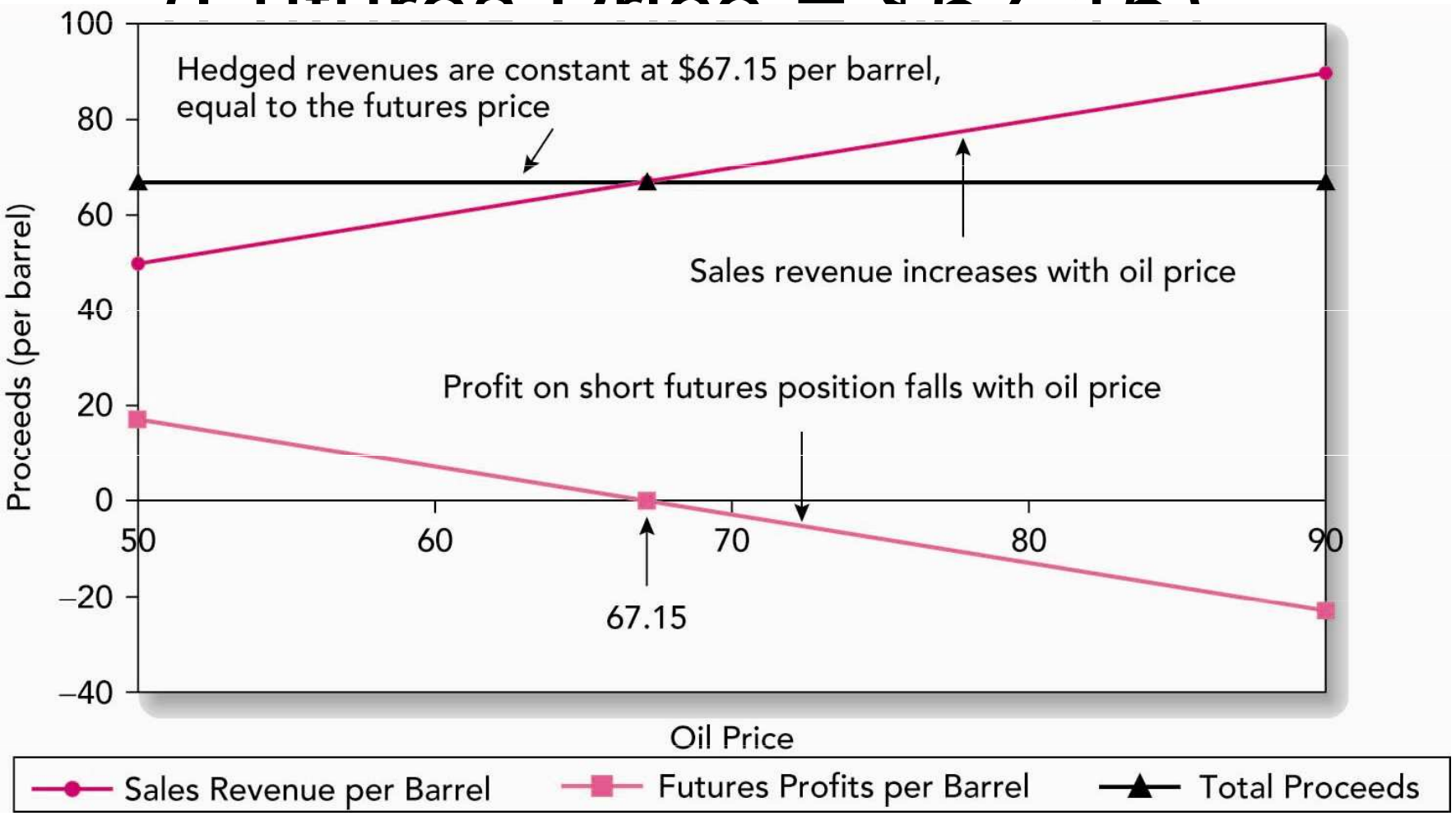
Consider an oil distributor planning to sell 100,000 barrels of oil in February that wishes to hedge against a possible decline in oil prices. Because each contract calls for delivery of 1,000 barrels, it would sell 100 contracts that mature in February. Any decrease in prices would then generate a profit on the contracts that would offset the lower sales revenue from the oil.

To illustrate, suppose that the only three possible prices for oil in February are \$95.15, \$97.15, and \$99.15 per barrel. The revenue from the oil sale will be 100,000 times the price per barrel. The profit on each contract sold will be 1,000 times any decline in the futures price. At maturity, the convergence property ensures that the final futures price will equal the spot price of oil. Therefore, the profit on the 100 contracts sold will equal $100{,}000 \times (F_0 - P_T)$, where P_T is the oil price on the delivery date, and F_0 is the original futures price, \$97.15.

Now consider the firm's overall position. The total revenue in February can be computed as follows:

	Oil Price in February, P_T		
	\$95.15	**\$97.15**	**\$99.15**
Revenue from oil sale: $100{,}000 \times P_T$	\$9,515,000	\$9,715,000	\$9,915,000
+ Profit on futures: $100{,}000 \times (F_0 - P_T)$	200,000	0	−200,000
TOTAL PROCEEDS	\$9,715,000	\$9,715,000	\$9,715,000

Figure 22.5 Hedging Revenues Using Futures, Example 22.5 (Futures Price = $67.15)



Basis and Basis Risk

- Basis - the difference between the futures price and the spot price
  - over time the basis will likely change and will eventually converge
  - On the maturity date of a contract, the basis must be zero
- Basis Risk - the variability in the basis that will affect profits and/or hedging performance
- Calendar spread

EXAMPLE 22.6 Speculating on the Basis

Consider an investor holding 100 ounces of gold, who is short one gold-futures contract. Suppose that gold today sells for $891 an ounce, and the futures price for June delivery is $896 an ounce. Therefore, the basis is currently $5. Tomorrow, the spot price might increase to $895, while the futures price increases to $899, so the basis narrows to $4.

The investor's gains and losses are as follows:

Gain on holdings of gold (per ounce): $895 − $891 = $4

Loss on gold futures position (per ounce): $899 − $896 = $3

The net gain is the decrease in the basis, or $1 per ounce.

EXAMPLE 22.7 Speculating on the Spread

Consider an investor who holds a September maturity contract long and a June contract short. If the September futures price increases by 5 cents while the June futures price increases by 4 cents, the net gain will be 5 cents − 4 cents, or 1 cent. Like basis strategies, spread positions aim to exploit movements in relative price structures rather than to profit from movements in the general level of prices.

Futures Pricing

Spot-futures parity theorem - two ways to acquire an asset for some date in the future

- Purchase it now and store it
- Take a long position in futures
- These two strategies must have the same market determined costs

Spot-Futures Parity Theorem

- With a perfect hedge the futures payoff is certain -- there is no risk
- A perfect hedge should return the riskless rate of return
- This relationship can be used to develop futures pricing relationship

Final value of stock portfolio, S_T	$ 1,510	$ 1,530	$ 1,550	$ 1,570	$ 1,590	$ 1,610
Payoff from short futures position (equals $F_0 - F_T = \$1{,}550 - S_T$)	40	20	0	−20	−40	−60
Dividend income	25	25	25	25	25	25
TOTAL	$ 1,575	$1,575	$1,575	$1,575	$1,575	$1,575

Rate of Return for the Hedge

$$\frac{(F_0 + D) - S_0}{S_0} =$$

$$\frac{(1{,}550 + 25) - 1{,}500}{1{,}500} = 5\%$$

General Spot-Futures Parity

$$\frac{(F_0 + D) - S_0}{S_0} = R_f$$

Rearranging terms

$$F_0 = S_0(1 + r_f) - D = S_0(1 + r_f - d)$$

$$d = D / S_0$$

Arbitrage Possibilities

- If spot-futures parity is not observed, then arbitrage is possible
- If the futures price is too high, short the futures and acquire the stock by borrowing the money at the riskfree rate
- If the futures price is too low, go long futures, short the stock and invest the proceeds at the riskfree rate

Future Market Arbitraga

Suppose that parity were violated. For example, suppose the risk-free interest rate in the economy were only 4% so that according to Equation 22.1, the futures price should be $\$1{,}500(1.04) - \$25 = \$1{,}535$. The actual futures price, $F_0 = \$1{,}550$, is \$15 higher than its "appropriate" value. This implies that an investor can make arbitrage profits by shorting the relatively overpriced futures contract and buying the relatively underpriced stock portfolio using money borrowed at the 4% market interest rate. The proceeds from this strategy would be as follows:

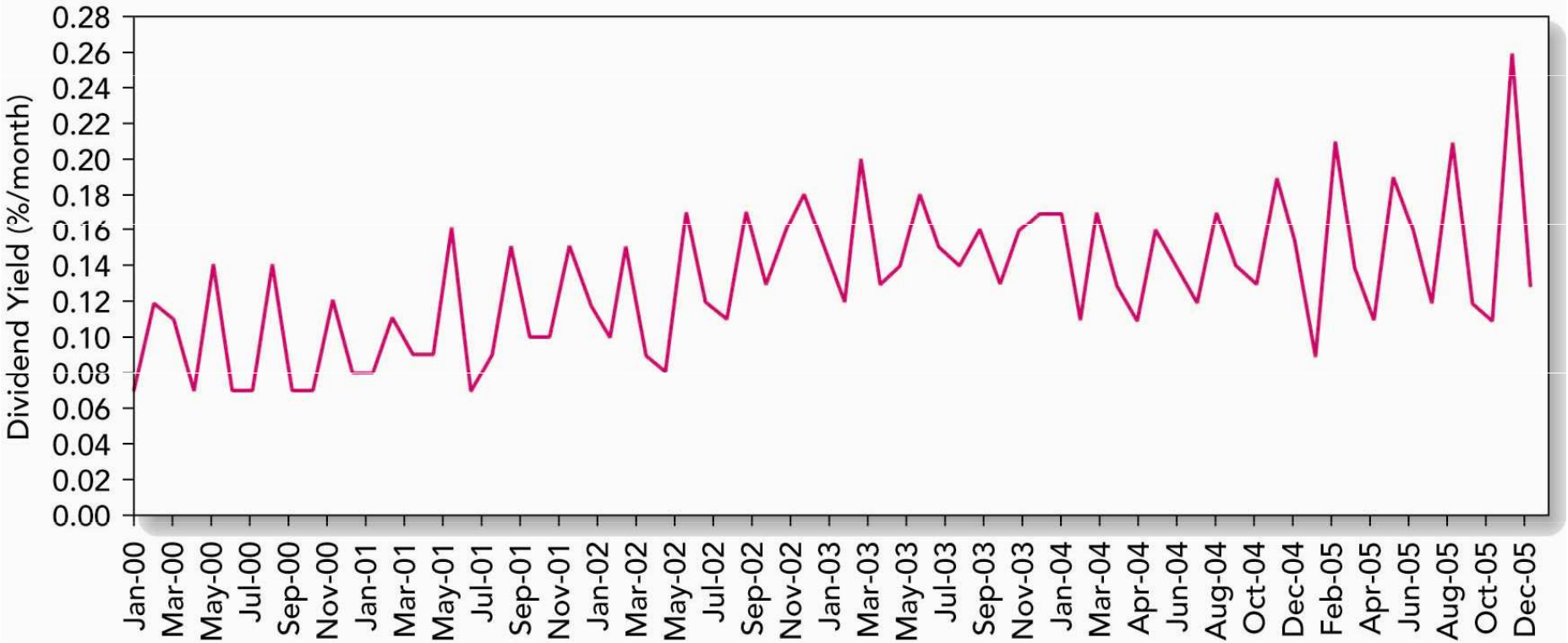
Action	Initial Cash Flow	Cash Flow in 1 Year
Borrow \$1,500, repay with interest in 1 year	+1,500	−1,500(1.04) = −\$1,560
Buy stock for \$1,500	−1,500	S_T + \$25 dividend
Enter short futures position (F_0 = \$1,550)	0	\$1,550 − S_T
TOTAL	0	\$15

Action	Initial Cash Flow	Cash Flow in 1 Year
1. Borrow S_0 dollars	S_0	$-S_0(1 + r_f)$
2. Buy stock for S_0	$-S_0$	$S_T + D$
3. Enter short futures position	0	$F_0 - S_T$
TOTAL	0	$F_0 - S_0(1 + r_f) + D$

Spread

- Relation between future prices of contracts of different maturity days
  - Futures price is in part determined by time to maturity
  - If rf > d

Figure 22.6 S&P 500 Monthly Dividend Yield



Spread Pricing: Parity for Spreads

$$F(T_1) = S_0(1+r-d)^{T_1}$$

$$F(T_2) = S_0(1+r-d)^{T_2}$$

$$F(T_2) = F(T_1)(1+r-d)^{T_2-T_1}$$

To see how to use Equation 22.3, consider the following data for a hypothetical contract:

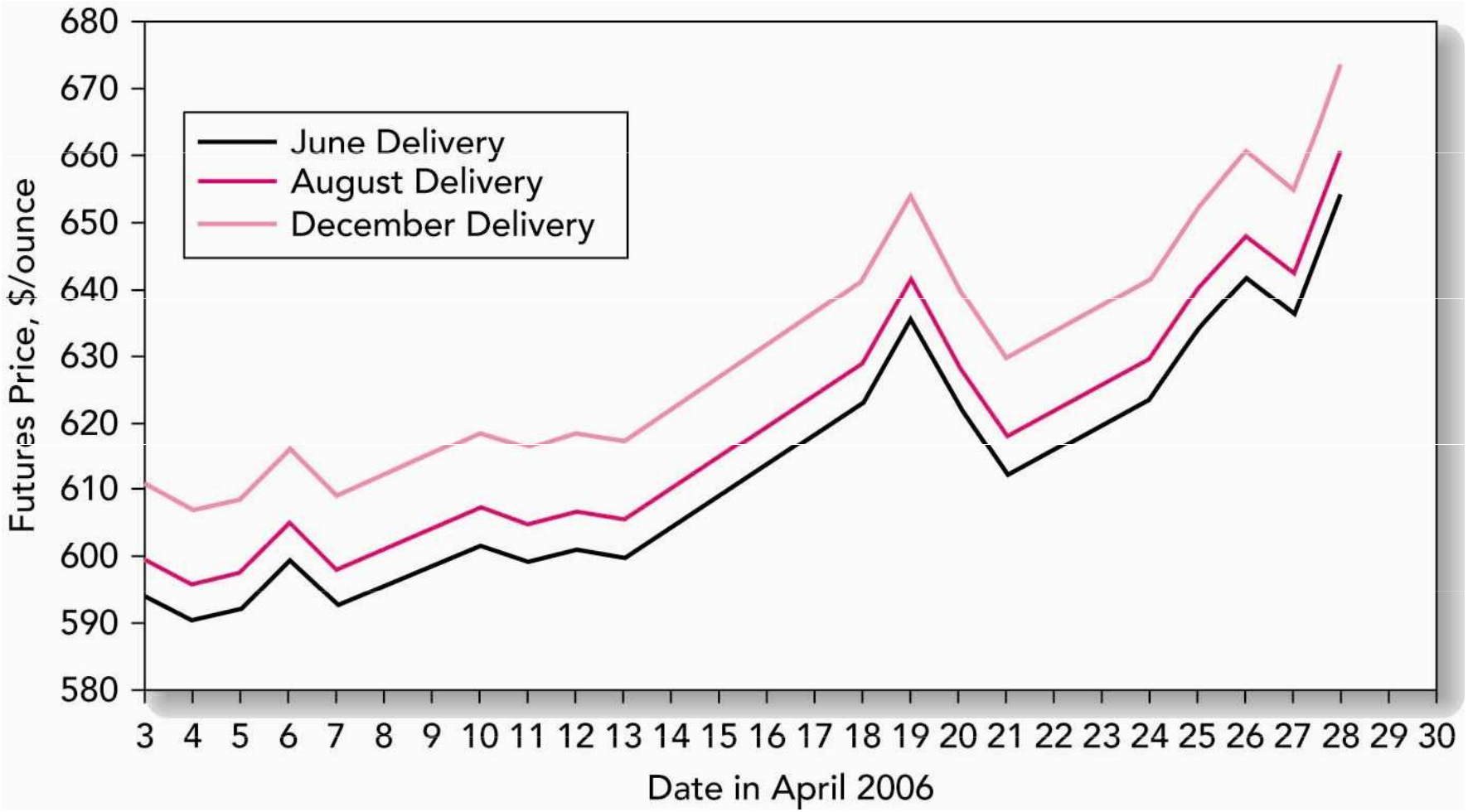
Contract Maturity Data	Futures Price
January 15	$105.00
March 15	105.10

Suppose that the effective annual T-bill rate is expected to persist at 5% and that the dividend yield is 4% per year. The "correct" March futures price relative to the January price is, according to Equation 22.3,

$$105(1 + .05 - .04)^{1/6} = 105.174$$

The actual March futures price is 105.10, meaning that the March futures price is slightly underpriced compared to the January futures and that, aside from transaction costs, an arbitrage opportunity seems to be present.

Figure 22.7 Gold Futures Prices



Theories of Futures Prices

- Expectations
- Normal Backwardation
- Contango

Figure 22.8 Futures Price over Time, in the Special Case that the Expected Spot Price Remains Unchanged