Mechanics of Futures and Forward Markets

- Futures contract specifications
- Futures contracts and margin
- Futures trading and patterns
- Futures price patters
    - –vs maturity
    - –over time
    - –expected future spot
- Regulation of Futures markets
- Forward contracts
- Forwards vs futures
- Profits diagrams for forwards/futures

- See http://www.tradesports.com

Futures Contracts 1

- Futures Contracts – Exchange traded; Settled daily; Volume >$2B contracts/yr.
  - >99% of commodity contracts offset (closed) before first delivery day.
  - Few contracts (stock indexes (SP500), Eurodollars) have cash settlement.

- Delivery Specs – Ag contracts $10k-20k; financial $100k+; Some mini contracts.
  - Ag contracts usually deliver any day over specified month.
  - Short position chooses quality/location/day, with price adj. Avoid "squeeze"

- Delivery – Trading usually ceases either last day of month (ag) or 3rd Friday.
  - Position day (T–2) –
  - Notice of intention day (T–1) –
  - Delivery day (T) –
  - Exchange for physicals – allows delivery terms to be privately negotiated.

- Futures Traders – on exchange. (Dual traders do both).
  - Commission broker – executes trades for institutions or individuals. Often employed by futures commission merchants (brokerage firm).
  - Local – trades for their own account. Aka floor trader.

Futures Contract sample quote

- S&P 500 Index futures - Volume – number of trades in 1 day.
  - Open interest – total number of contracts outstanding (# long or short)

	Open	High	Low	Settle	Change	Lifetime High	Lifetime Low	Open Interest
Sept	1207.50	1210.50	1196.00	1209.20	+5.50	1218.00	1127.30	360,960
Dec	1220.00	1223.00	1212.00	1224.20	+5.50	1234.00	1160.70	7,137

- Dec 05 Cattle futures – note volume (blue bar) and open interest (red line).
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Futures Contracts –Agriculture

- **CME Lumber –**
  Delivery specifications – Each delivery unit shall consist of nominal 2x4s of random lengths from 8-20 ft, grade-stamped Construction and Standard, Standard and Better, or #1 and #2; however, in no case may the quantity of Standard grade or #2 exceed 50%. Each delivery unit shall be manufactured in CA, ID, MT, NV, OR, WA, WY or Alberta, BC and contain lumber from grade stamped Alpine fir, Englemann spruce, hem-fir, lodgepole pine and/or spruce fir.
  Delivery arrangements – On track and shall either be unitized in double-door boxcars or, at no additional cost to the buyer, each unit shall be individually paper-wrapped and loaded on flatcars. Par delivery of hem-fir in CA, ID, MT, NV, OR and WA in the province of BC.

- **CME Corn (5,000 bu) –**
  Deliverable Grades No. 2 Yellow at par, No. 1 yellow at 1 1/2 cents per bushel over contract price, No. 3 yellow at 1 1/2 cents per bushel under contract price

- NYMEX (see icons); CBOT: Education, Contract Specs; NYBOT FCOJ Contract.

Futures Contracts – Gold and Gas

- **NYMEX Gold –**
- **Delivery** – Gold delivered against the futures contract must bear a serial number and identifying stamp of a refiner approved and listed by the Exchange. Delivery must be made from a depository licensed by the Exchange.
- **Grade and Quality Specifications** – In fulfillment of each contract, the seller must deliver 100 troy ounces (±5%) of refined gold, assaying not less than .995 fineness, cast either in one bar or in three one-kilogram bars, and bearing a serial number and identifying stamp of a refiner approved and listed by the Exchange. A list of approved refiners and assayers is available from the Exchange upon request.

- **NYMEX Natural Gas – see http://www.nymex.com and http//www.cme.com**
- **Delivery –** The Sabine Pipe Line Co. Henry Hub in Louisiana. Seller is responsible for the movement of the gas through the Hub; the buyer, from the Hub. The Hub fee will be paid by seller.
- **Delivery Period –** Delivery shall take place no earlier than the first calendar day of the delivery month and shall be completed no later than the last calendar day of the delivery month. All deliveries shall be made at as uniform as possible an hourly and daily rate of flow over the course of the delivery month.
- **Alternate Delivery Procedure (ADP) –** An alternate delivery procedure is available to buyers and sellers who have been matched by the Exchange subsequent to the termination of trading in the spot month contract. If buyer and seller agree to consummate delivery under terms different from those prescribed in the contract specifications, they may proceed on that basis after submitting a notice of their intention to the Exchange.

Futures Contracts – Margin 1

- Futures positions are marked-to-market daily and require margin be posted!
  - Margin – cash or securities deposited with broker.
  - Typical margins 5-20% of value; maintenance (variation) margin ~25% less.
  - Clearinghouse – requires clearing members (exchanges) to secure margin and serves as master bookkeeper and settlement agent.

- Ex: Long 2 Dec gold futures contracts on June 5 at futures price $600/oz.
  - Contract size is 100 oz, so notional value of contract is $60,000 ($120k total).
  - Margin/contract is $2,000 ($4k total) with maintenance at $1,500 ($3k).

- Q: If final price is $592.30/oz. What is profit?
- A1: Profit (loss)
- A2:
  -

- Q: What is maximum that long position can lose (and short position gain)?
- A:
  -
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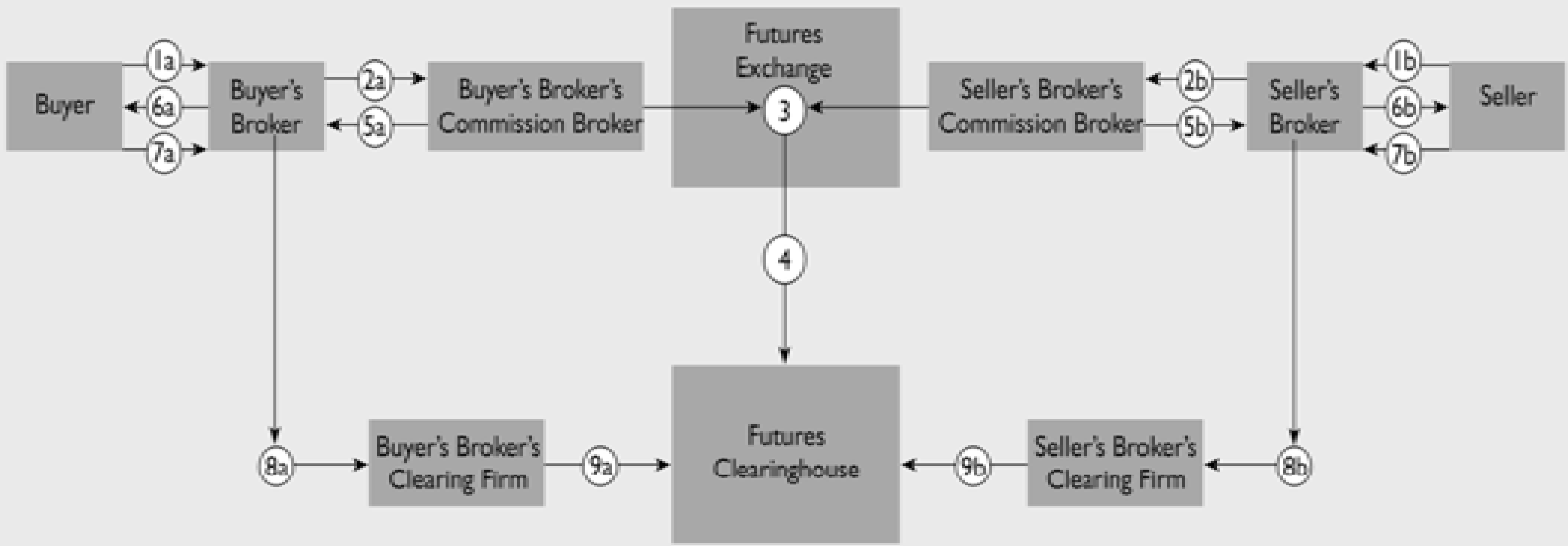
Futures Contracts – Margin 2

Day	Futures Price (US$)	Daily Gain (Loss) (US$)	Cumulative Gain (Loss) (US$)	Margin Account Balance (US$)	Margin Call (US$)	
	600.00			4,000		
5-Jun	597.00	(600)	(600)	3,400	0	
⋮	⋮	⋮	⋮	⋮	⋮	
13-Jun	593.30	(420)	(1,340)	2,660	+ 1,340	= 4,000
⋮	⋮	⋮	⋮	⋮	⋮	< 3,000
19-Jun	587.00	(1,140)	(2,600)	2,740	+ 1,260	= 4,000
⋮	⋮	⋮	⋮	⋮	⋮	
26-Jun	592.30	260	(1,540)	5,060	0	

- •Gain on Margin Acct = 5060 – (4,000+1340+1260) = –1540.
- •Leverage – Price of gold dropped ~ 1.5%; Acct lost ~ 40%. (> 20-to-1 leverage)!
- •Forwards – Not marked-to-market. Loss of $1,540 realized at expiration.
  - •Some uses: trading with leverage, cash drag on index fund. See CME

Futures transaction



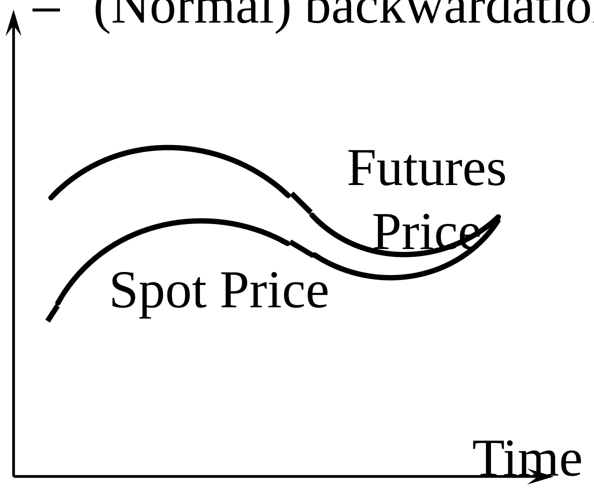
(1a)(1b) Buyer and seller instruct their respective brokers to conduct a futures transaction.
(2a)(2b) Buyer's and seller's brokers request that their firms' commission brokers execute the transaction.
(3) Both commission brokers meet in the pit on the floor of the futures exchange and agree on a price.
(4) Information on the trade is reported to the clearinghouse.
(5a)(5b) Both commission brokers report the price obtained to the buyer's and seller's brokers.
(6a)(6b) Buyer's and seller's brokers report the price obtained to the buyer and seller.
(7a)(7b) Buyer and seller deposit margin with their brokers.
(8a)(8b) Buyer's and seller's brokers deposit margin with their clearing firms.
(9a)(9b) Buyer's and seller's brokers' clearing firms deposit margin with clearinghouse.

Note: Either buyer or seller (or both) could be a floor trader, eliminating the broker and the commission broker.

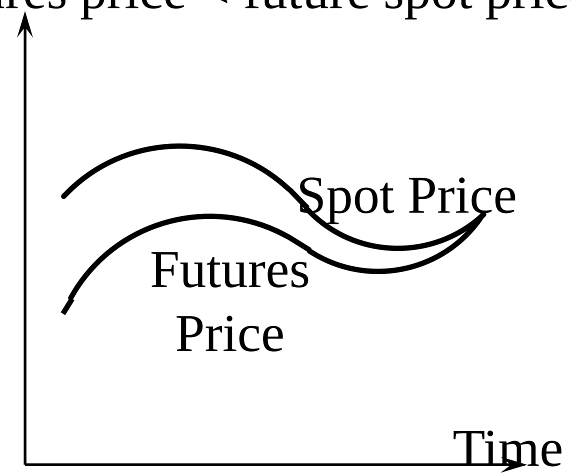
Futures vs Spot Prices

- Price patterns – Futures price path versus spot price path (over time).
  - Prices will tend to converge at contract nears maturity.
  - Intuition – the day before delivery, futures and spot mkt almost identical.

- Futures price relative to spot price
  - Contango – current futures price > future spot price.
  - (Normal) backwardation – current futures price < future spot price.



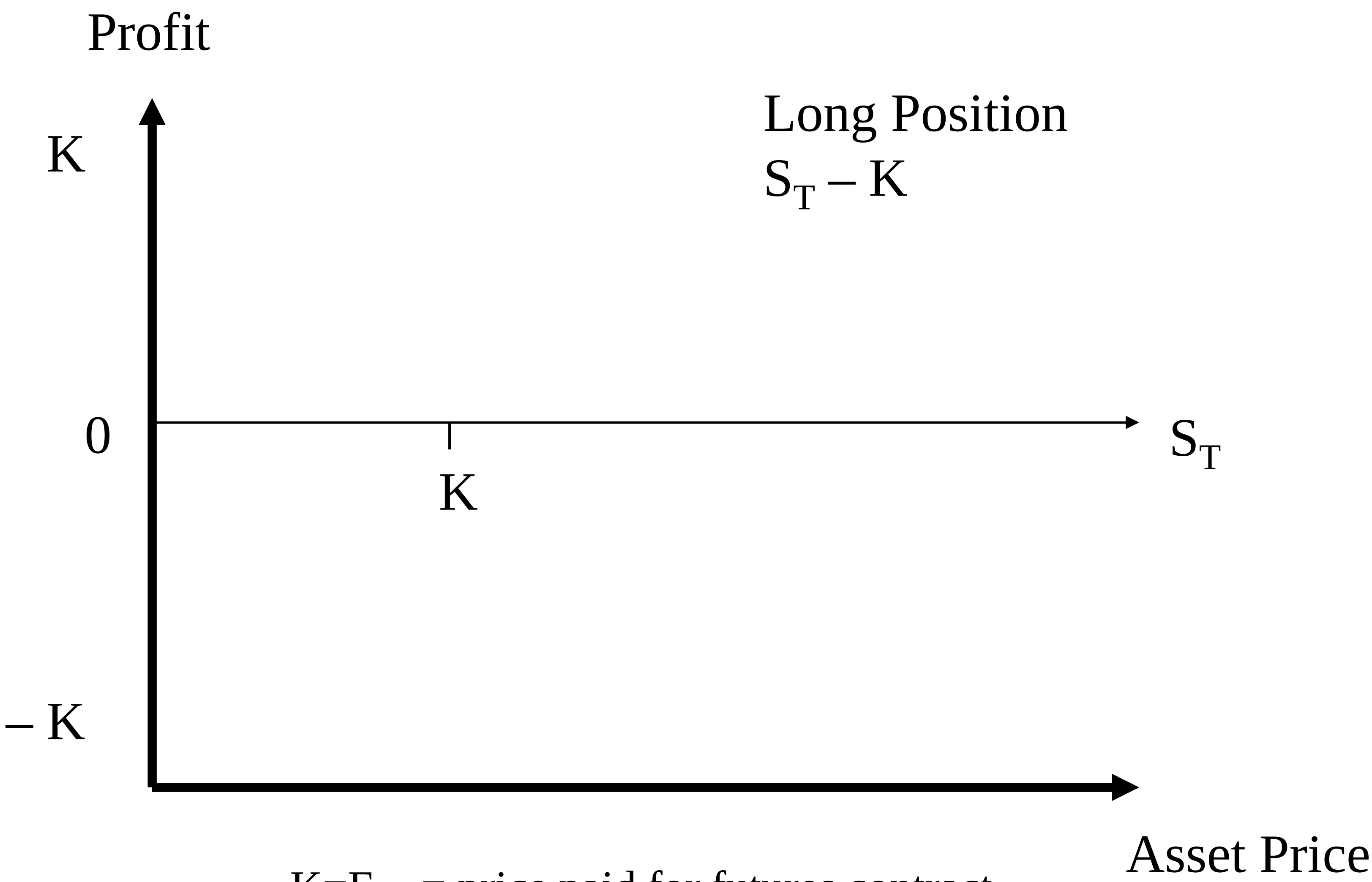
(a) Contango



(b) Backwardation

- Note on open interest – note that a futures transaction cause open interest to increase, stay the same, or decline.

Futures: Profits at Maturity



$K = F_{0,T}$ = price paid for futures contract

Regulation of Futures

- Commodity Futures Trading Comm (CFTC) – authorizes exchanges to operate.
  - Regulates mkts to protect the public interest and ensure “fair” practices.
  - Reviews contracts and supervises markets
  - Registers agents handling customers
  - Position limits for speculators
  - Hunt bros cornered silver 1970s-80. Prices $6 (1/79); $50 (1/80); $12 (3/80)

- Commodity exchanges (CME, CBOT, NYMEX..) – rules cover trade clearance
  - trade records, position limits, price limits (volatility)
  - disciplinary actions, floor trading practices and standards of conduct.

- Accounting - FASB 52 (FX) FASB 80 (Futures) FASB 133 (all derivatives).
  - Hedging - recognize profits/losses concurrently with item hedged.
  - Speculation - recognize profits/losses as marked to market. 60% cap gains.
  - In practice, can be difficult if hedges not perfect.

More on Futures Trading

- Lui Qibing (2005) senior commodities trader for National Control Center for State Reserve Board of China. Most trades on Shanghai exchange.
  – July: amasses large short position (100k-600k tons) by selling futures contracts on copper at around $3,300 per ton. Delivery in Dec.
  – Total value $3B-$20B.
  – November: prices above $4,200 per ton.
  – Reportedly pressured to double up positions to offset his current losses.

- Markets speculate that Chinese agency has amassed huge short positions.
  – Markets expect large purchases to offset these short positions.
  – This would drive prices up, so other traders go long copper, and prices rise.

- Chinese govt
  – Denies existence of Lui Qibing – to help stop price increases?
  – Eventually acknowledged Qibing and sold 20,000 tons of copper.
  – Moved tons more near storage facility.
  – This would tend to create risk for speculators and keep prices down.

Forward vs Futures Contracts

Forwards	**Futures**
Private contract	Exchange traded
Non-standard	Standardized
Usually 1 specified delivery date	Range of delivery dates during month
Settled at maturity	Settled daily
Delivery or final cash settlement	Contract usually closed prior to maturity.
Contract initially has zero value, then changes.	Contract effectively reset daily to have zero value.

- Foreign Exchange - Future and forward markets are both very active.
  - Futures quoted as number of $USD/FX.
  - Some forwards and spots quoted as FX/$USD (CAD, JPY).

- Utilizing leverage of futures in stock portfolios
  - Portable alpha –