Chapter 2

Mechanics of Futures and Forward Markets

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• Forward Contract
  
  – A forward contract is an agreement to buy or sell an asset at a certain time in the future for a certain price
  
  – There is no daily settlement. At the end of the life of the contract one party buys the asset for the agreed price from the other party
  
  – "long" position means to buy forward or accept delivery
  
  – "short" position means to sell forward or make delivery
  
• How Forward Contract Works
  
  – The contract is an over-the-counter (OTC) agreement between 2 companies
  
  – No money changes hands when first negotiated & the contract is settled at maturity
- The delivery price is set so that the initial value of the contract is zero to either party

- **Forward Price**
  - The forward price for a contract is the delivery price that would be applicable to the contract if were negotiated today
  - The delivery price is fixed over time
  - But the forward price of new contracts change as spot price changes
  - The forward price may be different for contracts of different maturities

- **Examples**
  - Investor X enters into a long forward contract to buy 100 oz. of gold at $400 per oz. in 90 days
- Investor Y enters into a short forward contract to sell 100 oz. of gold at $400 per oz. in 90 days
- The spot price is $350 in 90 days
- Investor X loses $5000 over the 90 day period
- Investor Y makes $5000 over the 90 day period

● Payoff Diagram

- Long Forward

- Short Forward
• Futures Contract

  – Roughly speaking, a futures contract is a forward contract that is modified so that it can trade on an exchange.

  – A forward contract cannot trade on exchange because

    * Contracts can have unique specification

    * Delivery price is fixed, while forward price changes

    * Default risk is associated with counter parties
• Solution
  – Standardize contract terms:
    * Quantity
    * Quality
    * Delivery dates
  – Clearinghouse assumes default risk by taking the opposite side of each trade
  – Contracts are settled daily or marketed to market

• Mechanics of Futures Markets
  – Clearinghouse
    * Intermediary in all futures transactions
    * Assumes opposite position in all trades
* Default risk is therefore shifted to the clearinghouse

* Brokers are members or must channel business through members

− Margin

* Good faith money deposited by both the buyer and seller of futures

* Protects clearinghouse and broker from default

* Types of margin
  
  · Initial Margin

  · Maintenance Margin

  · Variation Margin

  · Clearing Margin
- Marking to Market
  * Investors deposit margin into an account
  * At the close of trading, all accounts adjusted based upon settlement prices
  * In effect, each contract is replaced with a new contract for delivery at the settlement price
  * Account are adjusted up or down to make up the difference

- Example
  * An investor takes a long position in 2 December gold futures contracts on June 5
  * contract size is 100 oz.
  * futures price is US$400
  * margin requirement is US$2,000/contract (US$4,000 in total)
* maintenance margin is US$1,500/contract (US$3,000 in total)

* What price change triggers a margin call?
  
  · Investor receives margin call if account value drops by $500

  · Since investor is long account value drops if futures price falls

  · Therefore, margin is triggered if price falls by $500/100 oz = $5/oz

  · At a price of $F = 400 - 5 = $395/oz

  · What if investor is short?

* Possible Outcomes – Table 2.1, Page 27
<table>
<thead>
<tr>
<th>Day</th>
<th>Futures Price (US$)</th>
<th>Daily Gain (Loss) (US$)</th>
<th>Cumulative Gain (Loss) (US$)</th>
<th>Margin Account Balance (US$)</th>
<th>Margin Call (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-Jun</td>
<td>397.00</td>
<td>(600)</td>
<td>(600)</td>
<td>3,400</td>
<td>0</td>
</tr>
<tr>
<td>13-Jun</td>
<td>393.30</td>
<td>(420)</td>
<td>(1,340)</td>
<td>2,660</td>
<td>+ 1,340 = 4,000</td>
</tr>
<tr>
<td>19-Jun</td>
<td>387.00</td>
<td>(1,140)</td>
<td>(2,600)</td>
<td>2,740</td>
<td>+ 1,260 = 4,000</td>
</tr>
<tr>
<td>26-Jun</td>
<td>392.30</td>
<td>260</td>
<td>(1,540)</td>
<td>5,060</td>
<td>0</td>
</tr>
</tbody>
</table>

- **Key Points**

- Futures are settled daily

- Closing out a futures position involves entering into an offsetting trade

- Most contracts are closed out before maturity

- So accounts are settled at three times:
  
  * When a new buy or sell order is executed
* At the close of trading each day

* When an offset buy or sell is executed
  - If contract is held to maturity, the gain or loss is the same as forward, neglecting interest on margin account.

* With forward the gain or loss is realized at maturity.

* In other words, the account is settled at maturity.

* With futures the gains or losses are distributed over the live of the contract.

• Delivery
  - If a contract is not closed out before maturity, it usually settled by delivering the assets
underlying the contract. When there are alternatives about what is delivered, where it is delivered, and when it is delivered, the party with the short position chooses.

- A few contracts (for example, those on stock indices and Eurodollars) are settled in cash

**Trading Terminology**

- Open interest: the total number of contracts outstanding
- equal to number of long positions or number of short positions
- Settlement price: the price just before the final bell each day
- Used for the daily settlement process
- Volume of trading: the number of trades in 1 day
• When a new trade is completed what are the possible effects on the open interest?
  
  – new buy meets new sale
  
  – offset sale meets new buy
  
  – offset buy meets new sale
  
  – offset buy meets offset sale

• Convergence of Futures to Spot Price (Why?)

• Traders
– Seat on Exchange is required to trade

– Commission Brokers execute trades for other people

– Locals trade for their own account

– Open-Outcry auction

– Bid is a proposal to buy

– Offer is a proposal to sell

● Types of Orders

– Market Order - buy or sell at best price

– Limit Order - buy or sell at given price or better

– Stop Order - market order conditioned on stop price
• **Tax Accounting**
  
  – If a contract is used for
    
    * hedging: it is logical to recognize profits (losses) at the same time as on the item being hedged
    
    * speculation: it is logical to recognize profits (losses) on a mark to market basis
  
  – Roughly speaking, this is what the treatment of futures in the U.S. and many other countries attempts to achieve

• **Normal Backwardation**
  
  – Hedgers tend to hold short positions
  
  – Therefore, speculators must hold net long positions
- If speculators are risk averse, they want to be compensated for assuming risk

- Therefore, the futures price must be less than the expect future price

- Contango: futures prices are greater than expected future price

**Forward vs Futures Prices**

- **TABLE 2.3, page 41**

<table>
<thead>
<tr>
<th></th>
<th>FORWARDS</th>
<th>FUTURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private contract</td>
<td>Private contract between 2 parties</td>
<td>Exchange traded</td>
</tr>
<tr>
<td></td>
<td>Non-standard contract</td>
<td>Standard contract</td>
</tr>
<tr>
<td>Usually 1 specified</td>
<td>Usually 1 specified delivery date</td>
<td>Range of delivery dates</td>
</tr>
<tr>
<td>Delivery or final</td>
<td>Delivery or final cash settlement usually</td>
<td>Delivery or final cash</td>
</tr>
<tr>
<td>settlement occurs</td>
<td>occurs prior to maturity</td>
<td>settlement usually occurs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>prior to maturity</td>
</tr>
</tbody>
</table>

- Also
* Forward contract is exposed to default risk

* With futures clearinghouse assumes default risk

* Margin required for futures trading

• Forward vs Futures Price: In theory, the futures price for a contract should be almost the same as the forward price for a contract with the same maturity on the same asset