E&G, Chapter 3
I. Mechanics of Trading a Security.

A. **Order Size and Price Quotes**.

1. Round Lot = 100 shares of stock; Odd Lot < 100 shares.
   a. Round Lots have lower transactions costs.

2. Bid/Ask Quote - can sell at bid price, or buy at ask price.
   a. Tick - minimum price change allowed on exchange.
   Recently reduced to 1 penny.
   b. Bid/Ask Spread should ideally be one tick;
   actually varies with market liquidity and volatility.

B. **Types of Orders**.

1. Market Order - buy or sell at best price currently available.
   a. e.g. Suppose current bid/ask spread is 55 - 55¼;
   IF you get the current quotes,

   A market order to buy 1 round lot would result in
   buying 100 shares @ ($55.25 + commission);

   A market order to sell 1 round lot would result in
   selling 100 shares @ ($55.00 - commission).

   b. NOTE: You may not get the current bid/ask quotes.

   Other orders may be ahead of you & affect spread;
   Other info may arrive before your order is executed;
   Quotes may change before your order is executed.

   Market order insures execution, with some price risk.

2. Limit Order - buy at ≤ max price or sell at ≥ min price.
   a. Controls the price paid or received, but
   no way of knowing when or if order will be filled.

3. Stop Order - an order that is activated only when stock price reaches a predetermined limit (the stop price). Then becomes market order.

   a. Stop Loss Order at $40 - sell if price declines to ≤ $40.
      e.g. if you bought at $20 and stock rose to $50,
      you may worry that stock could crash;
      can use Stop Loss Order to lock in a min gain @ $40,
      but allow for further possible increases above $50.

   b. Stop Buy Order at $40 - buy if price rises to ≥ $40.
      Often used along with a short sale to limit losses.

4. Short Sale - selling securities you do not own; hope to buy back lower.

   a. Brokerage firm borrows shares from another investor and sells on behalf of short seller.

   b. Short seller must pay owner all rights ownership represents, such as dividends paid by the firm.

   c. Shorting can be used to bet on a price decline.
      Alternatively, shorting allows you to 'cover' other positions.
      Thus, can reduce downside exposure without really selling.

C. Length of Time an Order is Outstanding.

1. Market Orders executed immediately (within seconds or minutes).

2. For other orders, must specify a length of time order is in effect.

   a. Day Order - if not filled by end of day, cancel.
      If investor doesn't specify a time, it is assumed a day order.

   b. Good until cancelled Order - stays alive until cancelled.

   c. Fill or Kill Order - if can't be filled immediately, cancel.

II. **Margin** - Can borrow part of the amount of investment position.

Margin is the part of this position that the investor puts up,
specified as a percentage of the purchase price of asset;
a good faith collateral deposit, investor's equity position.

Margin insures market integrity.

The brokerage firm acquires the margin loan from a bank,
and administers the loan to the investor.

The securities bought serve as collateral
for the investor's loan and for the broker's loan.

1. Initial Margin - minimum equity required for initial position.
   [set by Federal Reserve Board]

2. Maintenance Margin - min equity required to maintain position.
   [set by exchanges]

3. Variation Margin - changes in Margin over time.

A. **Margin on Long Purchase**.

1. Margin = $\frac{\text{market value of assets - amount borrowed}}{\text{market value of assets}}$

a. Example: Buy 100 shares of XYZ @ $100/share,

	100% Margin	50% Margin
Value of Assets:	$10,000	$10,000
Amount Borrowed:	$0	$5,000
Equity:	$10,000	$5,000
Initial Mgn:	$10,000/$10,000 = 100%	$5,000/$10,000 = 50%

b. Suppose XYZ price ↑ 30% to $130/share;

	100% Margin	50% Margin
Value of Assets:	$13,000	$13,000
Amount Borrowed:	$0	$5,000
Equity:	$13,000	$8,000
ROE:	$3,000/$10,000 = 30%	$3,000/ $5,000 = 60%
New Margin:	$13,000/$13,000 =100%	$8,000/$13,000 = 62%

c. Suppose XYZ price ↓ 30% to $70/share;

	100% Margin	50% Margin
Value of Assets:	$7,000	$7,000
Amount Borrowed:	$0	$5,000
Equity:	$7,000	$2,000
ROE:	-$3,000/$10,000 = -30%	-$3,000/$5,000 = -60%
New Margin:	$7,000/ $7,000 = 100%	$2,000/$7,000 = 29%

2. Effect of Margin on ROE; Margin uses leverage.

a. Gains/losses are multiplied by leverage (= 1/Margin).
If you use 100% margin, ROE = (% change in price)x(1);
if you use 50% margin, ROE = (% change in price)x(2).

B. **Margin on Short Sale** is computed differently;
must be calculated as percentage of market value of the shorted securities.

1. Margin = $\frac{\text{value of assets - market value of securities sold short}}{\text{market value of securities sold short}}$

a. Example: Short 100 shares of XYZ @ $100/share, use 50% Margin;

	Assets		Liabilities
Cash from Short Sale:	$10,000	Market Value of Securities Shorted:	$10,000
Cash from Investor:	$5,000	Equity:	$5,000
Total Value of Initial Position:	$15,000		$15,000

Margin = [$15,000 - $10,000]/[$10,000] = 50%

b. If price of XYZ falls to $50, Good news -- Margin ↑ above 50%;

Mkt Value of Assets stays same; Mkt Value of Securities Shorted ↓ to $5,000;

Margin = [$15,000 - $5,000]/[$5,000] = [$10,000/$5,000] = 200%.

You doubled your $5,000 equity! ROE = +$5,000/$5,000 = 100%.

c. If price of XYZ rises to $150, Bad news -- Margin ↓ below 50%;

Mkt Value of Assets stays same; Mkt Value of Securities Shorted ↑ to $15,000;

Margin = [$15,000 - $15,000]/[$15,000] = [$0/$15,000] = 0%.

You lost your $5,000 equity! ROE = -$5,000/%5,000 = -100%.

d. If your account has both long and short positions,
must meet margin requirements for both types of trades.

III. Nature and Structure of Markets.

A. Market Classifications.

1. Primary vs Secondary Market.

   a. Primary - where new issues are sold.
   Secondary - where securities are resold.

2. Continuous Market vs Call Market.

   a. Continuous Market - trading takes place continuously; market order is executed quickly at best available price.

   b. Call Market - trading takes place at specified intervals.

   Several possible structures:

   i. Prices may be announced verbally;
   participants indicate amount they'll buy/sell;
   price is changed until buys & sells are closely matched;
   all transactions are then executed at that price.

   ii. Prices may be announced electronically;
   prices at which investors will buy/sell are entered;
   preliminary price is displayed;
   investors can change their orders until specific time;
   at this time, the price that best matches buys & sells is determined, and trades are executed at that price.
   If buys & sells not completely matched, allocate orders;
   e.g. may fill oldest orders on side with surplus first...

   - May limit price movements from prior price, to prevent temporary order imbalances from causing big price Δ;
   - Market orders are allowed in most call markets;
   all market orders are filled at the clearing price.
   Means greater price uncertainty than in continuous mkts.
   - NYSE opens each day with trade much like call market, then trading becomes continuous.
   Several European markets operate as call markets.

3. Broker vs Dealer Market.
   a. Broker Market - broker acts as agent for investor;
      broker buys & sells on behalf of investor;
      shareholders trade with each other directly using brokers as agents.
   b. Dealer Market - dealer maintains own inventory;
      trades with investors from own inventory;
      quotes bid/ask spread, makes money on the difference;
      investors do not trade with each other directly, but through dealer.

4. Trading executed by humans or electronically.
   a. NYSE, execution involves people;
      Toronto, Paris, Australia, ... execution done electonically.
   b. Advantage of computer execution;
      complex conditional trades can be executed easily.

B. Desirable characteristics of market.

1. High degree of *informational efficiency* -
   speed with which new information is incorporated into prices;
   desirable to be sure that price reflects all available information.

2. Accurate market *information* should be available in timely manner.
   a. past prices, volume, current bids & offers, short interest, ...
   b. participants better able to make valuation decisions;
      enhances informational efficiency.

3. Lower *trading costs* mean greater market efficiency.

4. Greater *liquidity* means greater market efficiency.
   a. Depth - how many players willing to trade near current price.
   b. Continuity - ability to trade any time near current price.

C. Major Markets in U.S.

1. Stock Markets.

Four Categories:

- Organized exchanges - stocks must be listed to trade...
- OTC market - trading in unlisted stocks (some requiremts).
- Third market - trading of listed securities in OTC mkt.
- Fourth market - refers to direct trades between institutions, without using exchange.

a. NYSE - corporation consisting of members who own seats; ownership of a seat allows member to trade on exchange; brokerage firms are major owners of seats.

- Members can serve any of four functions:

i. *Commission brokers* execute orders placed by the public.

ii. *Floor brokers* aid (i) when order flow becomes large.

iii. *Floor traders* trade for their own account (not public).

iv. *Specialists* keep the book that lists all limit orders.

Also trade for their own account.

Also charged with maintaining a "fair and orderly mkt;"
- supposed to absorb temporary order imbalances; obliged to trade at all times, insure continuous mkt; "market makers."

Also decide when the mkt for a given stock will open, so order imbalances will not cause big price changes.

Each stock has only one specialist; but a specialist may have several stocks.

Digression: How trading takes place on NYSE;
Consider an order to buy 1,000 shares of IBM:

i. Customer places order with broker.

ii. Broker can:

a) Enter the order into NYSE's superDOT trading system; order will be electronically transmitted to firm's booth, or entered on the IBM *specialist*'s book.

b) If large order, send to his/her firm's booth on the floor; firm's floor broker for IBM is paged & informed, floor broker then joins the 'crowd' to work the order.

Order can be executed in whole or in part, through trades with other floor brokers, the specialist, or trades against limit orders on the book.

*Only large orders are typically sent to firm's booth; small orders are usually entered on specialist book via superDOT system, and are executed by *specialist*.

iii. What does *specialist* do with order? – execute at best price.
If a *market order*, specialist can execute:
a) against another market order,
b) against *specialist*'s inventory of public limit orders,
c) a trade with a floor trader,
d) a trade with her/his own account.

NOTE: Because public orders have priority; *specialist* can trade with own account only if it leads to better price.

Alternatively, *specialist* can 'stop' the order; then customer is guaranteed the order will not be executed at a price worse than the existing bid or ask.

An order is stopped if *specialist* thinks price will improve. For example, an order is usually stopped when:

1) bid/ask spread > 1/8 (one tick), so *specialist* thinks can get a price within spread from floor brokers;

2) there is large order imbalance on the books, and *specialist* feels price will improve.

First trade of day is different → specialist operates call market; Decides when to open; indicates initial price; adjusts to balance.

iv. If a *limit order*, can also be entered using superDOT.
However, there is size limit to using superDOT system;
Market orders must be < 30,099 shares;
Limit orders must be < 99,999 shares.

v. *Large and medium sized trades* are usually from institutions, and may be handled differently.

If < 10,000 shares, will likely be executed over time by traders on the floor, maybe in pieces (working the crowd).

If > 10,000, not feasible to use specialist & crowd;

limit orders on the specialist books are unlikely to accomodate large orders without a large change in price;

furthermore, specialist is forbidden to solicit trades, and therefore cannot seek out other side of large trades.

Thus, large trades are typically negotiated in *upstairs market*;
block traders try to find other institutions to take other side.
In addition, part of block trade may be traded on exchange.
Finally, if this is insufficient to trade all shares in block, block trader may temporarily take part of position themselves.

vi. *Reuter's Instinet* is another way to handle institutional trades;

An electronic system that records institutional limit orders and facilitates execution against them (part of 'fourth market').

An information source for potential trading partners.

Limit orders on Instinet are 'expressions of interest,' not binding.

Has desirable feature of allowing electronic on-line negotiation without revealing names until trade is completed.

Widely used by inst. traders, block traders, and Nasdaq dealers.

End of Digression on NYSE trading system (first market).

b. OTC Market (second market).

Biggest market; Nasdaq -
National Association of Securities Dealers Automatic Quote system.

- Quote system allows potential traders to ascertain
  who is interested and at what price;
  an information source, not an electronic trading system.

- A broker trading for a customer will
  note which brokers are interested and at what prices;
  then contact a broker directly and negotiate a trade.

- Three levels of service available from Nasdaq:

i. Level III, given terminal that *can enter bids & asks*;
   must be prepared to execute > minimum amount (1,000 sh).

ii. Level II, traders *have access to all bids & asks*,
   plus names of firms making quotes;
   allows traders to determine where to obtain best price.

iii. Level I, simply *get best bid & ask* for any stock;
   normally for registered rep's dealing with customers.

- Nasdaq classifies some stocks as part of *National market system*
  depending on their trading volume.
  These stocks are eligible for short sales and margin purchases.

  OTC stocks *not* listed on *National market system* have bids & asks
  recorded on paper available once a day (the "pink sheets");
  these are mostly smaller illiquid firms.

  These quotes are not binding; simply give trader an idea
  of who is potentially interested in the stock.

  Now Nasdaq has electronic bulletin board for many stocks;
  facilitates more frequent trading.

c. Intermarket Trading System (ITS – third market).

A communications network that lists the most favorable quotes
across exchanges and the OTC market, for eligible securities.

If market maker receives order at his exchange with inferior quote,

can either match the best quote from ITS,
or can use ITS to send a "*firm commitment*"
to the exchange with the superior quote to trade at that quote.

Firm commitments are not subject to stops or exposed to crowd,
but trade at the quote.

System *intended to guarantee best price*; but this may not occur
because of possible quote changes during transmission of order,
possible price improvements through stop orders,
and the lack of exposure to the crowd.

Transmittal of the order to another exchange is not automatic;
it is triggered by the market maker.

If market maker fails to make the transfer,
the exchange with the best quote can complain;

Then the market maker must either adjust the price, or
make up for it by executing a trade with exchange with best quote.

d. Computerized markets (fourth market).

Set up to use computers to try to reduce transaction costs.
Three systems: Posit, Instinet, and NYSE after-hours system.

- These are '*crossing networks*' that match buys and sells.

- Unpriced orders are placed on one of these systems;
  system then matches buys and sells at prices determined
  in the underlying markets for the stocks;

  either at the closing price, if after trading hours,
  or at some average of opening and closing prices
  or at the midpoint of the bid/ask spread at some time,
  if during trading hours.

  Allows participants (inst. investors) to trade
  Inside bid/ask spread set by dealers on exchange.

- *Crossing networks* feed off the underlying markets;
  they play no role in determing prices;
  rather, the price is determined in the underlying market and
  these networks simply match buyers and sellers at this price.

Customers who use these systems are unsure of:
- price received, if done during trading hours, or
- whether trade will occur, since there may be order imbalances.

These systems exist because of perceived lower transactions costs.

The *Arizona stock exchange* is an electronic call market
where customers enter limit orders.
Computer calculates price that best matches buys & sells.
Customers can change orders or place new orders until 5 pm EST,
at which time trades are made.

2. Bond Markets.
   There is some listing of bonds on NYSE & AMEX;
   however, almost all bond trading in secondary market is done OTC.

   a. *Government bond* trading is high volume, liquid, and continuous;
      A number of major dealers take part in most trades.

      An institution wanting to trade Government bonds
      would call several dealers & get quotes;
      then would either take a quote or negotiate better quotes.

      An individual working through a broker would get their quotes.

      Most trading among Treasury dealers is done through
      5 government brokers.

   b. Secondary market for *Corporate bonds* or *Ginnie Maes*
      is fairly illiquid, except for recent or large issues.

      If you want a bond with certain characteristics (eg AAA 10-yr),
      you'll likely be offered a choice from the broker's inventory.

      Bid/Ask spread much higher than in government bond market.

      Dealers profit in three ways:
      i. bid/ask spread;
      ii. difference between interest earned on inventory
          and interest paid to finance it;
      iii. change in value of inventory.

      Dealers often hedge (iii.) with futures markets.

3. Primary Markets.

   a. New Government Bonds are issued by auction.

      New 91-day and 182-day Bills are issued every Monday;
      New 7-, 10-, and 30-year bonds are issued quarterly.

      Two types of orders can be placed:

      i. competitive bids (limit orders)
         placed by banks or brokerage firms designated by Fed;

      ii. noncompetitive bids (market orders) up to $1 MM;
         filled at avg price of all competitive bidders.

      Competitive bidders may receive the amount they ask for
      in their bid, some fraction of that, or none.
      Noncompetitve bidders will receive amount they request,
      but at an uncertain price.

      [Treasury considering new bidding system where everyone
       pays the same price, set as the price of the last bidder
       needed to sell all the bonds (the marginal bidder).
       The idea is that total government revenue could be higher
       (if all bidders bid higher since the price they pay
         is the marginal bid rather than their own bid).]

b. New Corporate bonds and common stocks
are usually underwritten by investment bankers.

Two types of issues:

i. Seasoned new issues, for companies with
publicly traded securities already outstanding;

ii. IPO's, for companies without publicly traded securities.

Underwriters can either:

i. buy the shares directly from the firm & resell to public
(firm commitment); or

ii. help firm sell to general public (best efforts).

Underwriters have a conflict of interest!
To serve corporate client, should get highest price for issue;
To make it easier to unload issue, should price lower.

IPO's tend to earn abnormally high returns first day...

IV. Types and Costs of Trades.

A. Types of Traders.

1. Liquidity Traders - either have excess cash or need cash.

2. Information Traders - perceive misspricing opportunity.

NOTE: Specialists or dealers should expect to gain on avg,
on deals with liquidity traders (the bid/ask spread), or
on deals with information traders who do not have
superior information;

But they should expect to lose on average, on deals
with information traders with superior information.

B. Trading Costs.

1. Three sources:
   a. Direct costs - commissions and taxes.
   b. Bid/Ask spread.
   c. Potential impact of large sale or purchase on quotes.

2. Another possible source of costs for liquidity traders:

Quoted prices may differ from equilibrium prices,
depending on degree of market efficiency.

Such differences may help or hurt the investor's return,
but they certainly increase return volatility,
and thus increase risk.