How securities are bought and sold

BKM, Chapter 3

- Readings
  - These notes.
  - BKM Chapter 3, Sections 3.1-3.5, 3.8

- Practice problems
  - The embedded problems in these notes (solutions on the course web site)
  - Chapter 3 Problem Sets 4, 8a, 8b, 13
  - CFA problem 2.
Topics

- Primary markets: *initial issues*
  - Auctions
  - Investment banking
- Secondary markets: trade *after* the initial sale
  - Limit order markets and dealer markets
  - Exchanges (NYSE, Nasdaq)
  - Mechanisms and order types

Primary markets

- The primary market is the security’s debut.
- The issuer is the seller of the security
  - A corporation has an initial public offering (IPO) of stock.
  - A corporation has a secondary offering of stock (a “seasoned equity issuance”)
  - A city sells bonds
Why don’t we auction the securities on eBay?

- Auctions are usually thought to be open, fair, and efficient.
- Auctions are used for ...
  - US government securities (Treasury bills, notes and bonds)
  - State and local bonds
    - The S&L bond auctions are only open to banks.
- Auctions are rarely used for corporate securities.
  - Important exception: the Google equity IPO.

Public offerings of corporate securities

- A firm wishing to sell securities holds a “bake-off”
  - i.e., invites presentations by investment bankers
  - One is selected as the lead underwriter, and forms a syndicate of other banks.
Cont’d

- The syndicate contacts potential buyers and decides how to price the issue (“book building”)
- Most issues proceed with a firm commitment.
  - The syndicate buys the entire issue at a fixed price and redistributes the securities.
  - The offer is still characterized as “primary market” even though the redistribution sales (technically) do not involve the issuer.

Equity Initial Public Offerings (IPOs)

- At the offering price, most issues are oversubscribed.
  - Not everyone gets the shares they want.
- On the first day of trading, shares usually rise (see next page).
  - The first-day “pop”
Private placements

- Securities directly sold to large investors (pension funds, insurance companies, etc.)
- Pros
  - Securities to be publicly offered must be registered with the Securities and Exchange Commission (SEC). A private placement avoids the expense and delay of registration.
  - Issuer and investor can share certain nonpublic info.
- Cons
  - Unregistered securities cannot be easily resold.

Figure 3.2  Average initial returns for (A) European and (B) Non-European IPOs
A website for solicitation of investment funds by for-profit corporations.

By US law, public solicitations are only permitted for (SEC-) registered securities.

- Registration is complex and lengthy.

2012 JOBS Act (“Jumpstart Our Business Startups”)

Final rules are still being written, but it looks like:

- Sale of unregistered securities will be permitted to “qualified” investors
  - A qualified investor has net worth > $1 million.
    (Note: Your house isn't counted toward your net worth.)

The securities: once people own them, they'll want to trade them.

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Secondary trading

- The buyer and seller aren’t related to the issuer.
- The transaction simply transfers ownership with no change in the original issuer’s financial position.

Examples

- A stock trade occurs on the Shanghai Stock Exchange
- A customer buys a GM bond from Credit Suisse.
The two main types

- Limit order (“order driven”) markets
  - Used for stocks, options, futures
  - Easy to understand, cheap to operate.
  - BKM call these “auction markets”.
- Dealer (“quote driven”) markets
  - Used for bonds, currency, swaps and over-the-counter derivatives.
- Other market types mentioned by BKM include brokered markets and direct search markets.

The limit order market: basic procedures

- Traders submit orders (“intention”)
  - An order has direction (buy or sell), quantity (shares) and price.
- If the order is the first order of the day, it becomes the first entry in the book.
- The book is the collection of unexecuted orders.
  - Execution: the matching of a buy and sell order to generate a trade.
  - Unexecuted orders are unmatched orders.
- Buy orders (bids) and sell orders (offers, asks) go into separate collections.
- Orders are sorted in price-time priority.
  - On the bid (buy) side of the market, higher bids have priority over lower bids.
  - On the offer (sell) side, lower ask prices have priority.
  - A bid that is relatively high or an ask that is relatively low is said to be “aggressive”.
- If two orders have the same direction and price, the order that arrived first has time priority.

Example: (batstrading.com) Try it yourself!
Morgan Stanley, 3 October 2011

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- The shares are cumulated over all the individual orders at the price.
- Best bid and offer (BBO): the highest bid and the lowest offer.
  - Aside: “NBBO” is the National Best Bid and Offer the highest bid and lowest ask over all the markets in which the security trades.
  - The spread = best ask – the best bid
- Individual orders can be canceled and modified at any time.

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**Basic procedures: trades (executions)**

- A newly-arrived order that can be executed immediately is said to be marketable.
  - A buy order priced at or better (higher) than the lowest ask in the book
  - A sell order priced at or better (lower) than the highest bid in the book.
- Example
  - Suppose the book shows 2,000 shares offered at $10.10.
  - An order arrives: Buy 500 shares at $10.25.
  - There’s a trade: the buyer and seller are matched for 500 shares at $10.10.
  - Note that the execution price is determined by the resting (pre-existing) limit order.
Suppose the book looks like this:

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity</th>
<th>Submitted at</th>
<th>Trader</th>
</tr>
</thead>
<tbody>
<tr>
<td>50.05</td>
<td>1,000</td>
<td>9:30</td>
<td>Cathy</td>
</tr>
<tr>
<td>50.00</td>
<td>500</td>
<td>9:32</td>
<td>Bill</td>
</tr>
<tr>
<td>50.00</td>
<td>400</td>
<td>9:31</td>
<td>Amy</td>
</tr>
<tr>
<td>49.50</td>
<td>1,000</td>
<td>9:39</td>
<td>Saito</td>
</tr>
</tbody>
</table>

- Terry submits an order to buy 1,000 shares limit $50.03.
- What happens? (Who trades? What does the book look like after the order has been processed?)

Embedded problem

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>50.05</td>
<td>1,000</td>
</tr>
<tr>
<td>50.00</td>
<td>500</td>
</tr>
<tr>
<td>49.90</td>
<td>100</td>
</tr>
<tr>
<td>49.70</td>
<td>200</td>
</tr>
<tr>
<td>49.50</td>
<td>100</td>
</tr>
<tr>
<td>48.00</td>
<td>300</td>
</tr>
<tr>
<td>45.00</td>
<td>1,000</td>
</tr>
</tbody>
</table>

- With the book as given at left, a new order arrives: sell 400 shares limit 49.70. What happens?
### Embedded problem (answer)

- 100 shares trades at 49.90; 200 shares trade at 49.70. Now 100 shares are left in the order. They get added to the book on the sell side:

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>50.05</td>
<td>1,000</td>
</tr>
<tr>
<td>49.70</td>
<td>100</td>
</tr>
<tr>
<td>49.50</td>
<td>100</td>
</tr>
<tr>
<td>48.00</td>
<td>300</td>
</tr>
<tr>
<td>45.00</td>
<td>1,000</td>
</tr>
</tbody>
</table>

### Order types

- A marketable limit order is priced to be immediately executed.
  - If the bid is 25.00, an order of “sell limit $25.00” is marketable.
- Some brokers and exchanges accept *market orders*
Market orders

- If I tell my broker, “buy 100 ZTEL at the market” this is a market order.
- Interpretation: “Buy 100 ZTEL. Get the lowest available price, but MAKE SURE THAT YOU BUY MY SHARES PROMPTLY”
- A market order does not carry a price.
  - So it differs from a marketable limit order.
- Emphasis is on execution certainty.
- Market orders are usually used by retail traders.

Make or take: the order choice decision

- If you want to trade, do you take someone else’s price?
  - Send a market (or marketable limit order) to hit their bid or lift their offer.
- Or, do you make a price of your own?
  - Send a (non-marketable) limit order hoping that someone will trade against it.
Example: Buying 100 shares of XYZ

- The market is 20.00 bid, offered at 20.10. with 1,000 shares on each side.
- Take: lift the 20.10 offer (buy at 20.10)
- Make: submit “buy 100 shares limit 20.02.”

Stop orders

- A stop loss (“stop sell”) order is a sell order with a trigger price.
- “At a stop price of 48, sell 100 sh of ZTEL” means
  - “If there is a trade in ZTEL at 48 or lower, submit a market sell order on my behalf.”
- Intent: sell the stock if it’s on the way down.
- There are also stop buy orders (“Buy the stock if it’s moving up.”)
- Most stop orders get converted (“elected”) into market orders, but you can also put in limit prices.
“At a stop price of 48, sell 100 ZTEL”

- This does not guarantee that I will sell at 48.
  - If the market is moving quickly, my market order might get filled at a lower price.
- Once the order gets executed, I’m out.
  - I don’t gain if the stock “bounces back”

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**Embedded problem**

```
Price    Quantity
Sell/Ask 50.05    1,000
Buy/Bid 49.90    100
  49.70    200
  49.50    100
  48.00    300
  45.00    1,000
```

- Suppose that in addition to the displayed orders, there is also a stop order: sell 1,000 shares limit 47.00, with a stop price of 49.70.
- A new order arrives: sell 200 sh limit 49.70. What happens?
## Embedded problem answer

- 100 shares trades @ 49.90; 100 @ 49.70. This completes the original order. The book looks like this:

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sell/Ask</td>
<td>50.05</td>
</tr>
<tr>
<td>Buy/Bid</td>
<td>49.70</td>
</tr>
<tr>
<td></td>
<td>49.50</td>
</tr>
<tr>
<td></td>
<td>48.00</td>
</tr>
<tr>
<td></td>
<td>45.00</td>
</tr>
</tbody>
</table>

- But the trade at 49.70 has triggered the stop loss order. 100 sh trades @ 49.70; 100 @ 49.50; 300 @ 48.00. There are 500 sh remaining in the order, but there are no more shares bid for at or above the limit price. So the remainder gets added to the book on the sell side, leaving:

<table>
<thead>
<tr>
<th>Price</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sell/Ask</td>
<td>50.05</td>
</tr>
<tr>
<td>Buy/Bid</td>
<td>47.00</td>
</tr>
</tbody>
</table>

## “Liquidity”

- Ability to buy or sell a large quantity, quickly, without moving the price very much.
- Based on the BATS book, we can buy over $100,000 of Morgan Stanley at 12.86/shares, immediately.
  - We can sell a similar amount at $12.85.
- By most standards, this is a liquid market.
Markets organized around limit order books.

- Some markets have a single consolidated limit order book, where everything happens.
  - This is *mostly* true of the Tokyo Stock Exchange, the Paris Bourse, the Taiwan Stock Exchange, and others.
- Some markets are fragmented.
  - There are multiple limit order books in different physical venues (or computers).
  - In addition to BATS, trading in Morgan Stanley occurs on the New York Stock Exchange, the American Stock Exchange, Nasdaq, and so on.

Listing and trading

- IBM is listed on the New York Stock Exchange
- Microsoft is listed on NASDAQ
- A listing is a sponsorship.
  - Companies pay to be listed on an exchange.
  - The exchange monitors the financial statements, governance and trading activity.
- The listing exchange is a “home” for trading activity.
  - But it doesn't have a monopoly on trading.
Limitations of limit order markets

- Book markets generally function very well for actively traded securities (IBM, MSFT, etc.)
- They have problems with inactively traded securities
  - There seems to be a “critical mass” of trading interest required for a viable book.

Two BATS order books (Friday 15 Jan 2009, approx 14:40)
So the book is empty. Who cares?

- A market needs to attract the marketable orders
  - Priced to seek immediate execution.
  - If we’re not going to get marketable orders, why bother posting a limit order in the first place?
- In going to the market to check prices, a potential customer incurs cost and delay.
- The customer must have an expectation that much of the time there will be an attractive trading opportunity.
  - Otherwise the market dies.

How to ensure that we always have a bid and offer?

- Assign the responsibility to a designated market maker (DMM)
  - Also known as
    - liquidity provider
    - designated dealer
    - (formerly, on US exchanges) “specialist”
- The DMM supports the market’s reputation as a place where a customer is always able to trade.
Nobody wants to always post bids and offers

- What do the DMM’s get in return?
- How should they get compensated?
  - On some European exchanges, the listed companies pay them.
  - Many US exchanges give them some sort of trading advantage.
- How should DMMs be regulated?

Dealer markets

- NYSE, Nasdaq, and the Euronext markets are primarily limit order markets.
- Dealers (market makers) are supplemental.
  - They make bids and offers in smaller issues.
- In a dealer (“over the counter”) market, dealers are the only trading mechanism.
- Important dealer markets include:
  - Foreign exchange (FX)
  - Over-the-counter derivatives
  - Swaps
  - US government and corporate bonds
Anatomy of a trade in a dealer market

- A hedge fund wishing to buy Euros may contact the FX desks (of large banks) and get bid and ask quotes.
  - The quotes are often oral, and good only at the time they are made.
  - The quotes are “take it or leave it”
- The dealer/customer arrangement is sustained by reputation:
  - The dealer will always make a market.
  - The customer must (sometimes) trade.

Typical features

- Dispersed network of dealers linked by computers and telecommunications.
  - Indicative dealers’ bids and asks widely disseminated.
  - Often, to get firm (actionable) bids and asks, you need to phone.
- Trades generally not reported.
- A dealer is always the counterparty to a customer trade.
Some representative stock exchanges

- New York Stock Exchange
- NASDAQ
- Euronext
- Shanghai

The New York Stock Exchange

- In value of listed companies, the largest stock exchange in the US.
- The trading mechanism is a hybrid of
  - Floor trading
    - Face-to-face bargaining by brokers representing customers or themselves.
  - A limit order book
  - A designated market-maker (the specialist)
- Presently, the limit order book dominates.
- The NYSE used to have a near monopoly on trading in its listed stocks.
  - Now its market share is around 20-30%
The NASDAQ Stock Market

- The principal listing alternative to the NYSE
  - “NASDAQ” originally stood for the National Association of Securities Dealers Automated Quotation system.
  - Many tech stocks list on Nasdaq (Microsoft, Intel, Cisco)
- NASDAQ never had a physical floor.
- Trading involves
  - A centralized order book
  - Designated market makers (formerly “dealers”)

Euronext

- Originally formed to consolidate the Paris, Amsterdam, Brussels and Lisbon exchanges.
  - Presently a subsidiary of NYSE Euronext, Inc.
- Operates the Paris, Amsterdam, Brussels and Lisbon stock exchanges, as well as the NYSE Liffe derivatives markets in London, Paris, Amsterdam, Brussels and Lisbon.
  - Liffe (“life”) formerly the London International Financial Futures Exchange
- Basic mechanism is the order book.
Shanghai Stock Exchange

- Limit order market
- Strong restrictions on
  - Short selling
  - Flipping
    - If you buy a stock, you can’t sell until the following day.
- Probably the most comprehensive record keeping in the world.
  - All customers are identified by a number that doesn’t change across brokerage accounts.