BEM 103

# Class 3:
# Exchange Mechanisms
# 10-07-2013

## Exchange mechanisms

Exchange as measure of value

Secondary markets and the double auction

Primary markets and underwriting

Rapid changes in the structure of global finance

# Establishing value

- You can (and should) do it by looking at fundamentals
- But incomplete unless you hold assets to maturity (when it has no further cash flow)
- Most of the time the investor/buyer wants to buy an asset at some time after it has been issued and/or sell it before maturity
- That is the role of secondary markets
  - Equity Markets (brokers and dealers)
- Focus of first half of this class
  - Second part will look at the issues
    - Investment banks

# Secondary markets

- Assets have been around for a  long time
  - Neither equity nor bonds were tradable easily. Equity was either in specific assets (so you sold assets rather than securities) or in partnerships (where you can't sell your position) and debt contracts were nominal (and could not be transferred without the agreement of the debtor)
- Organized exchanges have not (date from the 17th century)
  - Changes to create more liquid securities
    - Issuers (governments realize that investors are willing to pay for liquidity)
  - These can be traded either in organized public exchanges (Listed)
  - Or privately (over the counter-OTC)

# Exchanges not everything

- Still privately lots if held companies
  - Cargill, Koch Industries, and Mars (candy)
  - And the mom and pop store
- Today
  - Most firms are privately held (no secondary market for equity)
  - But most of the capital (firm value) in public companies.
- With debt things are a bit more complicated
  - Because of banks and other financial intermediaries
  - Private debt is mostly non market.

# Goals of Secondary Markets

- Liquidity:
  - Aggregate disparate sources of  demand and supply
- Transparency:
  - All important actors can share information before making decisions
- Mechanism is auction.
  - Initially one sided, sellers offer item with reserve price, and buyers bid
  - Soon enough (19$^{th}$ century), continuous double auction
    - Until the 2000s individual investors could not see what current bids looked like, only dealers and brokers.
    - Now IT has made it possible for everyone to see the current bids
- Investors send in orders, transaction occurs when  either
  - New bid (offer to buy) exceed the lowest current ask (offer to sell)
  - New ask (offer to sell)  is less than the highest current bid (offer to buy
  - price determined by what was on offer
  - parties pay commission, brokers pay exchange fees)

# Types of orders

- Bid/Ask in the double auction takes the form of an order
- The request to an intermediary to buy
  - Market order (X shares, X$ of bonds) is executed at best available price
  - Limit order (buy (sell) X shares at no more (or no less) than price p.
- More complicated orders
  - Stop orders these orders come into effect once the price crosses the stop price.
  - Fill or Kill (do it all or not at all right away)
  - All or None (do it at once or not at all)

# Types of markets

- Two basic technology depending on the function of the agent
  - Broker vs Dealer
- Used to be a big deal (NYSE broker, NASDAQ dealer)
- Now most exchanges are in effect dealers (because ultimate buyer sees the order book)
- Broker: the agent simply reports bids to a specialist (another agent) the specialist makes the market in a stock by matching bids.
- Dealer: the Asker's (seller's) agent 'buys' the security from his principal (the seller) and then transfers it to the bidder's agent who then 'sells' the security to the bidder "buyer."
- When investors cannot see the order book,
  - Specialist market has advantages in that the brokers and the specialist take fixed fees
  - Dealer market has advantage that dealers have incentive to make markets to capture spreads.
- When investors can see the order books it does not matter much because intermediaries can use their information to capture part of the gains from trade.

# Order books

- Market orders execute immediately (they take up the other side of the market)
- Limit orders go into the order book ranked from most expensive for bids and cheapest for asks
- The first five orders on each side are visible to everyone, but you can pay to see more.

| **First Solar Corp** | | | 11:54 AM **Friday 10-4** | |
|---|---|---|---|---|
| **Bid** | | | **Ask** | |
| Price | Size | | Price | Size |
| 44.34 | 500 | | 44.36 | 100 |
| 44.32 | 200 | | 44.41 | 100 |
| 44.3 | 300 | | 44.42 | 1,700 |
| 44.29 | 100 | | 44.43 | 100 |
| 44.28 | 200 | | 44.44 | 400 |

# Order books

| Exxon | | | |
|---|---|---|---|
| **Bid** | | **Ask** | |
| Price | Size | Price | Size |
| 86.34 | 1,400 | 86.36 | 1,700 |
| 86.33 | 1,500 | 86.37 | 1,100 |
| 86.32 | 1,400 | 86.38 | 1,100 |
| 86.31 | 1,800 | 86.39 | 1,200 |
| 86.3 | 2,000 | 86.4 | 1,700 |

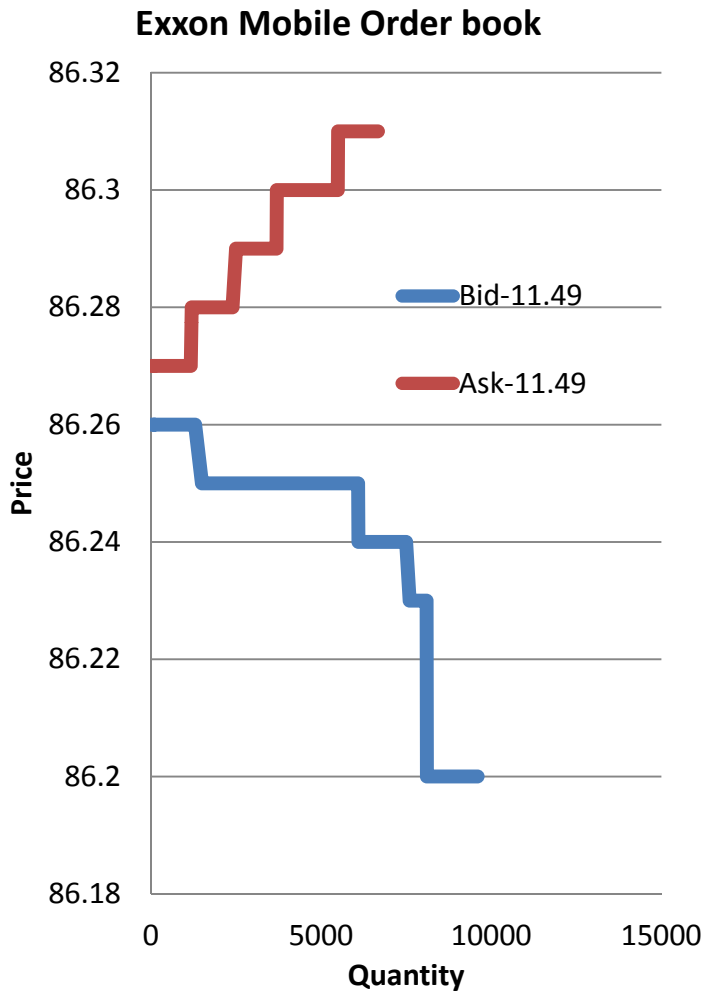
| First Solar | | | |
|---|---|---|---|
| **Bid** | | **Ask** | |
| Price | Size | Price | Size |
| 44.26 | 100 | 44.35 | 100 |
| 44.25 | 200 | 44.36 | 300 |
| 44.24 | 300 | 44.37 | 100 |
| 44.22 | 200 | 44.38 | 200 |
| 44.21 | 200 | 44.39 | 200 |

| Bio Time | | | |
|---|---|---|---|
| **Bid** | | **Ask** | |
| Price | Size | Price | Size |
| 3.79 | 1,100 | 3.82 | 100 |
| 3.76 | 100 | 3.84 | 100 |
| 3.74 | 100 | 3.91 | 100 |
| 3.69 | 100 | 3.94 | 100 |
| 3.68 | 100 | 4.09 | 100 |

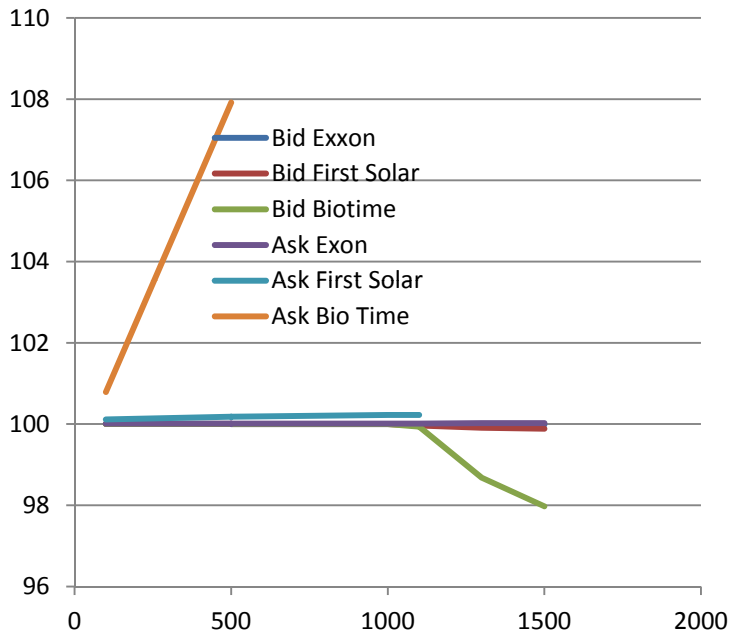
**Exxon:** second largest company by Market Cap (4.4 Billion shares outstanding)
**First Solar:** one of the smallest S&P500 (97.6 M shares outstanding)
**Bio Time:** a small publicly traded company (55M shares outstanding)

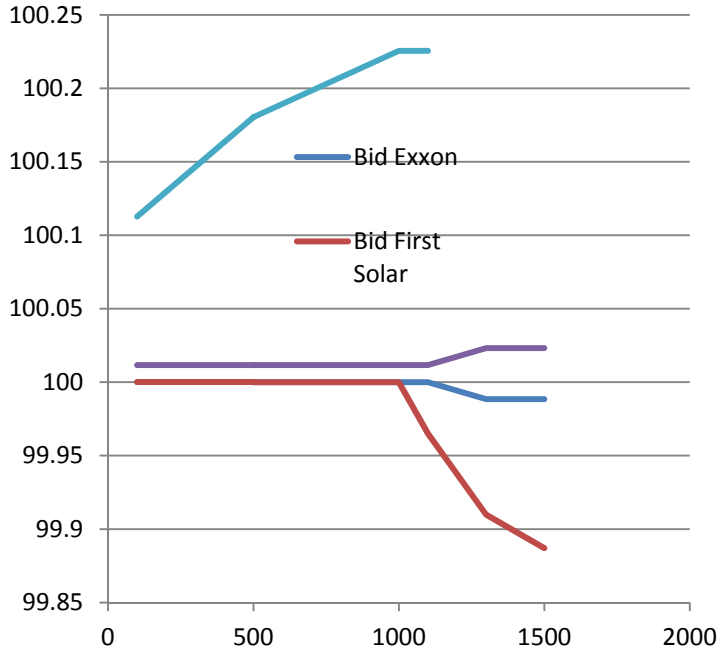
# How to interpret the order book

- Demand and supply
- Exxon order book at 11:49 am
- What you see is net supply and net demand (after the fillable orders have been filled)



# Different firms offer different levels of depth

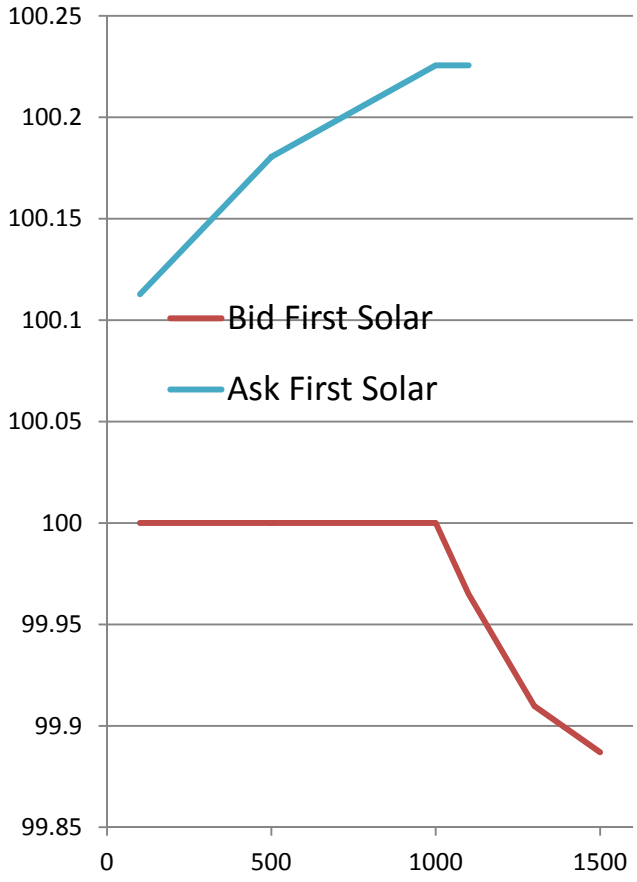



Bio Time, the smallest company has the steepest net supply and demand curves (prices *changes* very fast as you increase the size of your order)
At 500 shares the difference between the bid and ask price is almost 8% of price. But filling a 500 share order moves the price even for Exxon Mobil (by one or two cents or about 1/100 of 1%. This is market impact

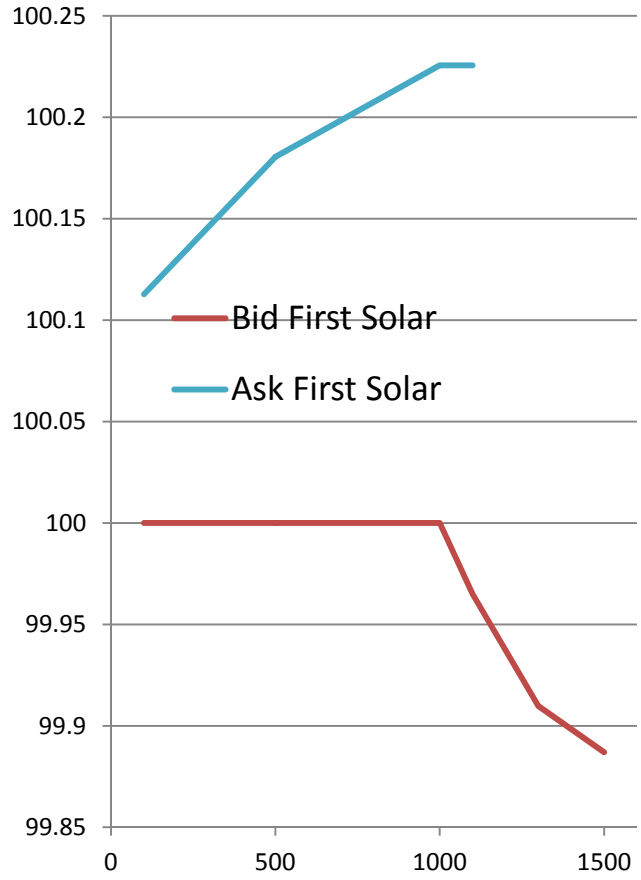
# Definition Spread

- A **spread** is a price difference between two sides of a market
  - In general a measure the cost of completing a transaction.
  - E.g. Cost of credit to a borrower vs payment to lenders (difference is the additional costs).
- **Bid-Ask Spread** is price difference between buyers' and sellers' prices.
  - It does not measure the cost of a transaction directly, but by how much order prices have to change for another transaction to occur.
- From buyers and seller's perspective smaller Bid-Ask Spreads are better because they make execution prices more predictable
  - With a large bid ask spread if you send in an buy order, the price may well be quite different from last transaction.
  - With a small one…



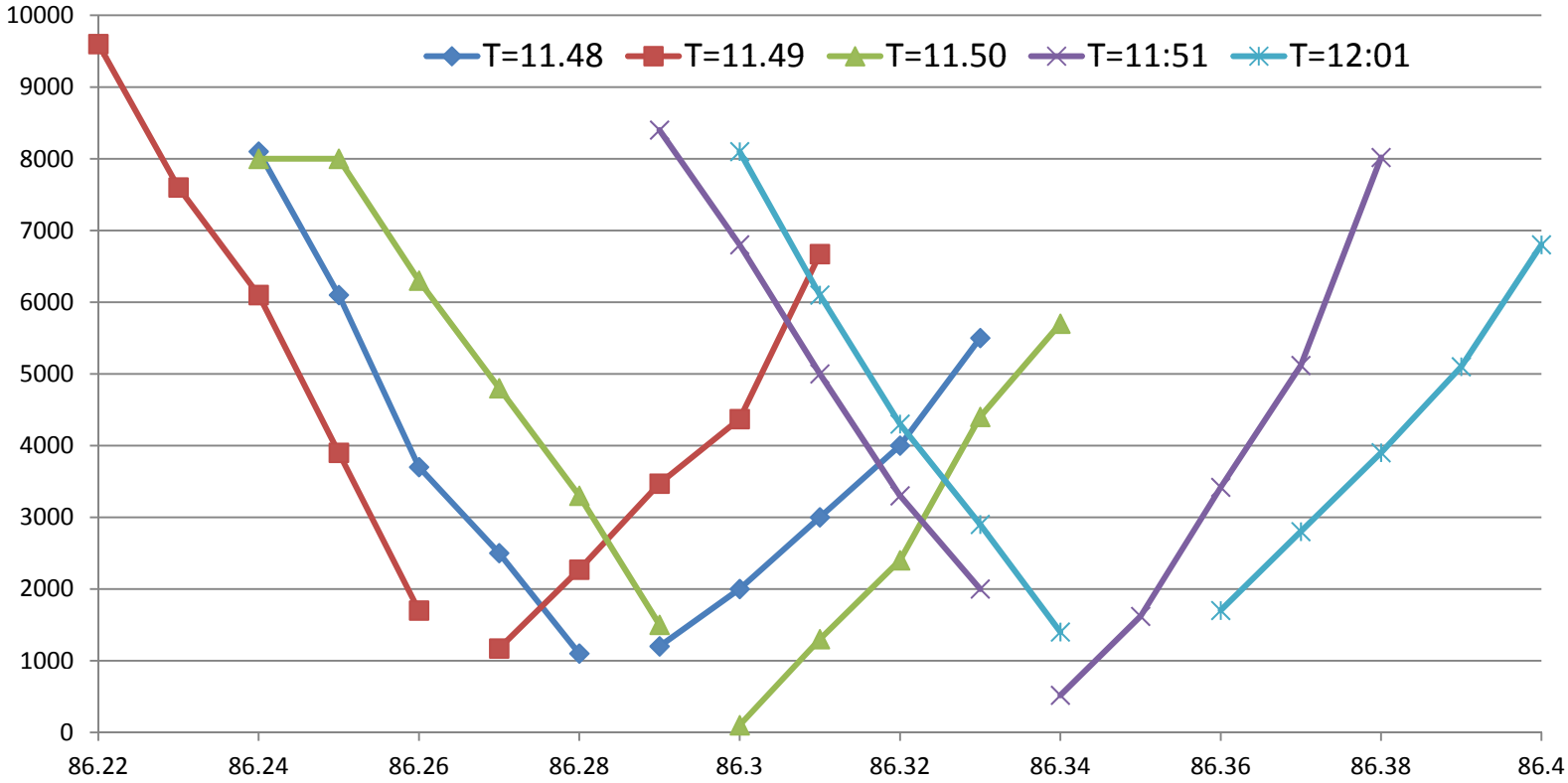
# Definition Liquidity

- Spreads measure levels
- Liquidity is the slope of the bid and ask curves.
- It measures how fast price rises (falls) when you increase the size of the next transaction.
- Buyers and sellers want flat (elastic) curves, again because they provide predictability to transaction execution
- Liquidity increases with the number of shares outstanding, decreases with share price, and with the number of places a particular security is traded.

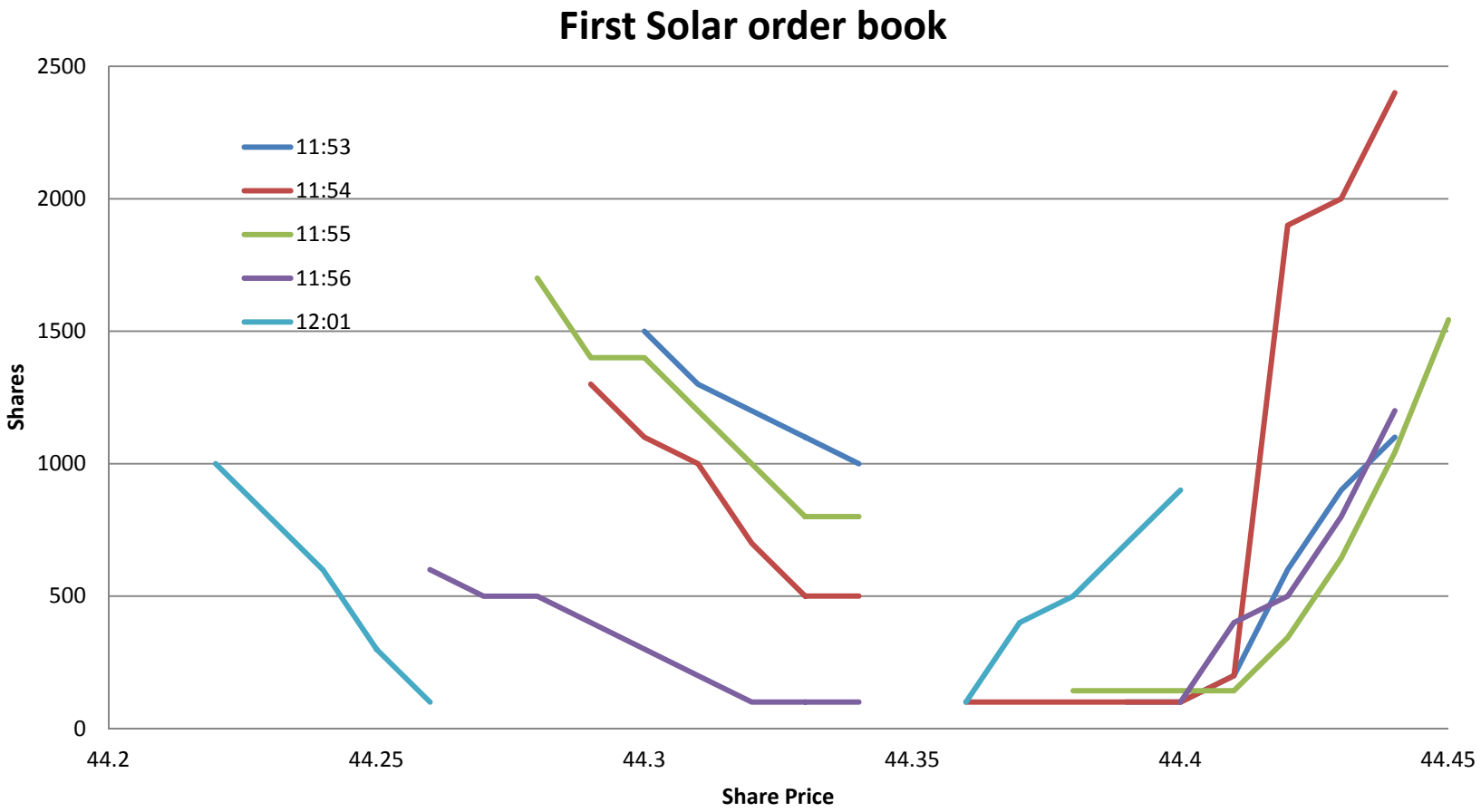


# Order book evolves through time

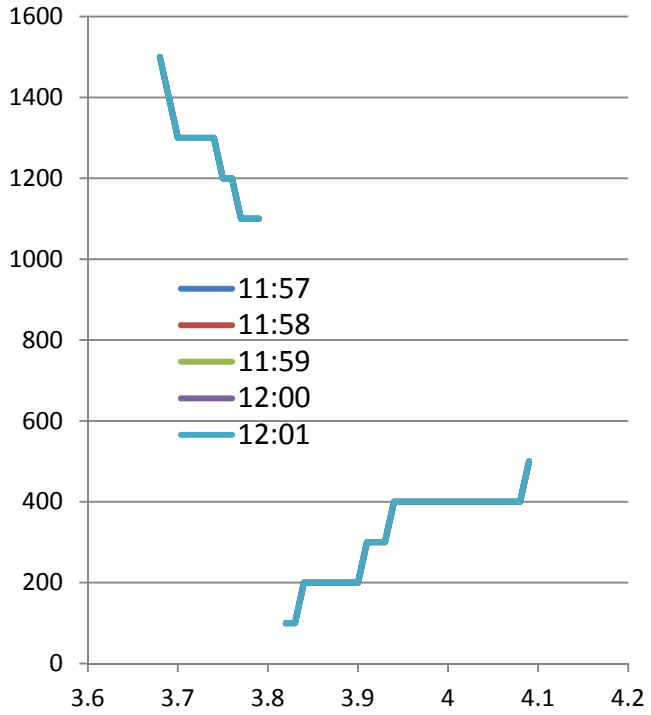
- Orders may be withdrawn, market orders executed, new limit orders come in.
- If price is going down the order book moves left (48 to 49)
- If down it moves right (49-50-51 and then to 12:01)
- Still Exxon Mobil



# Order book evolves (2)



# Bio Time

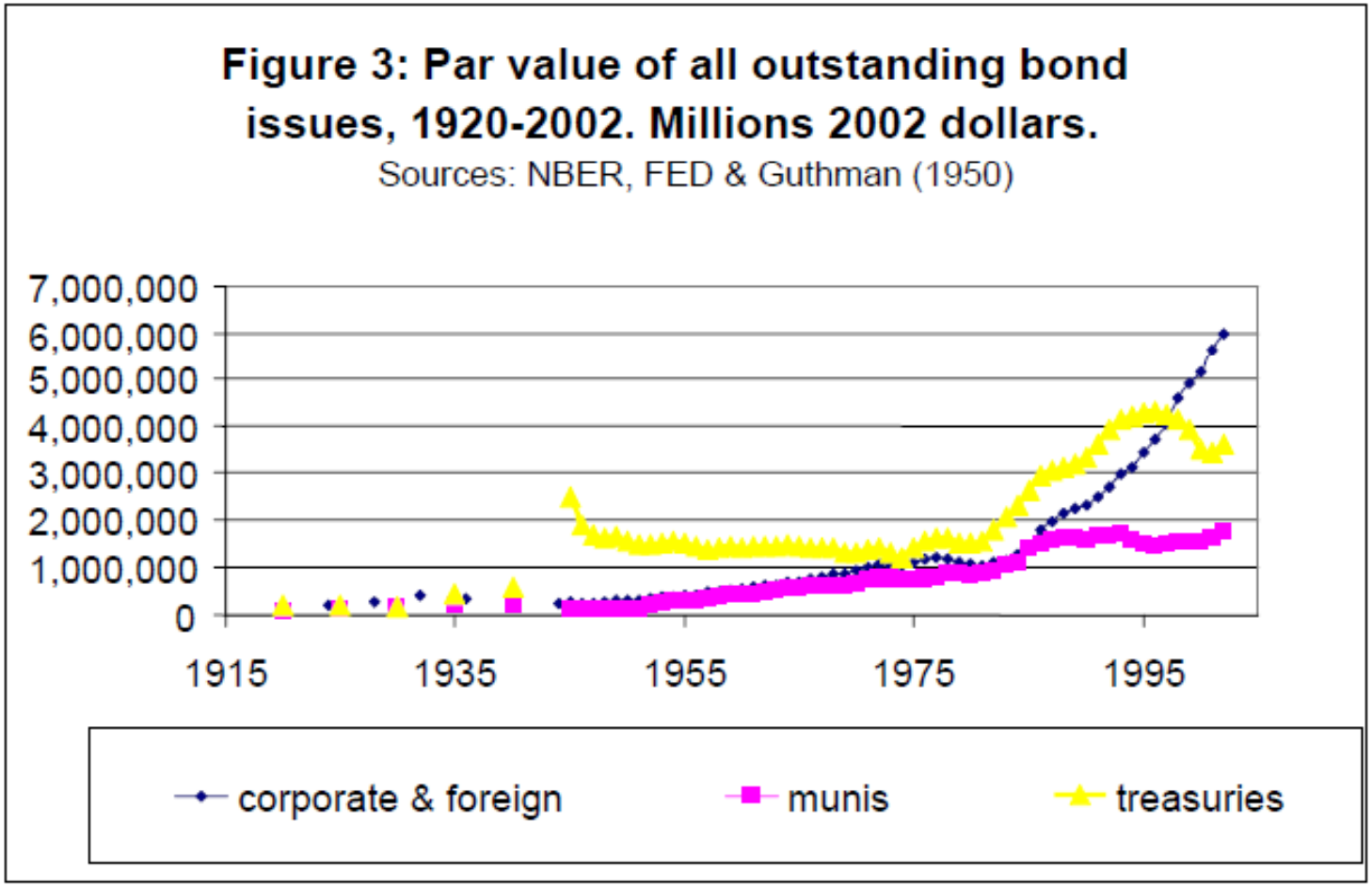



Here the pb is that there are no new limit orders and no market orders over this 5 minute period of time
Market is and

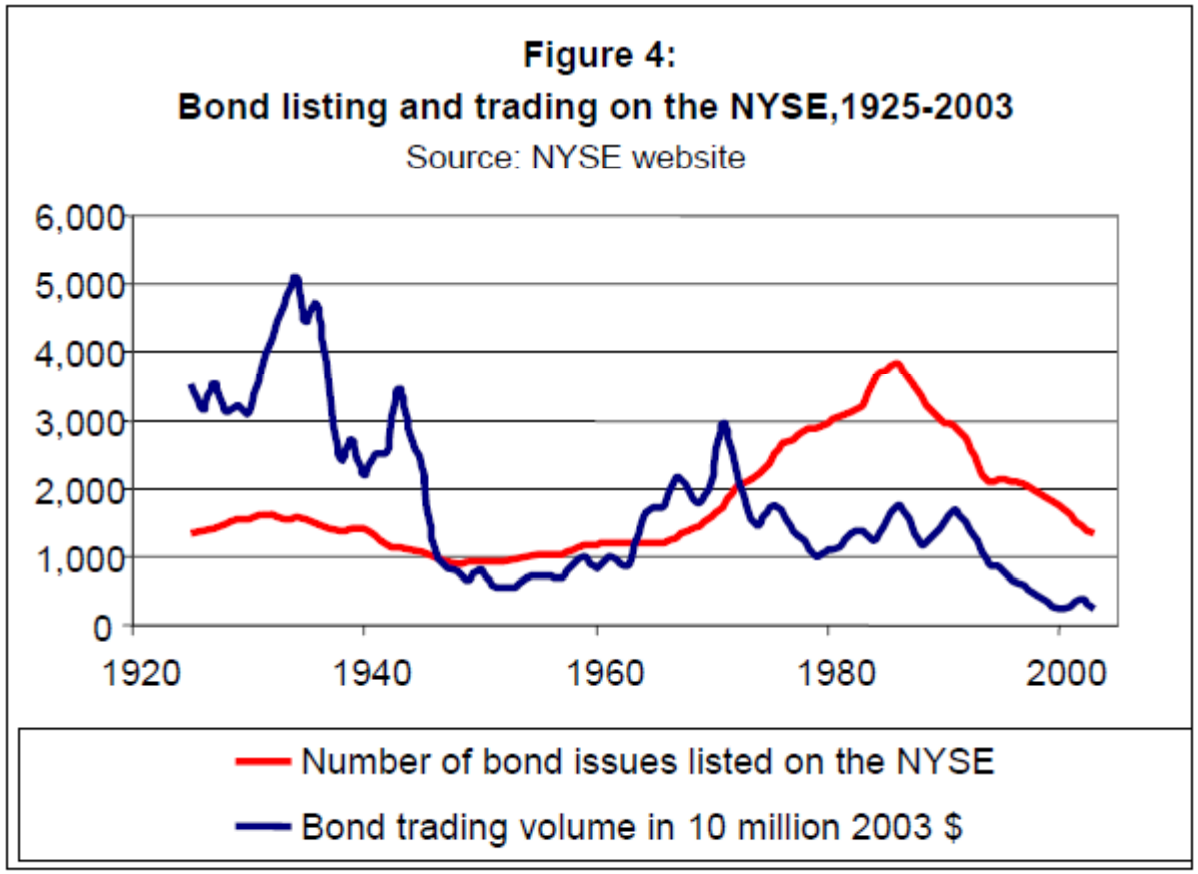
# Secondary markets

- Provide liquidity and valuation
- Use continuous double auction
- Increasing returns because investors prefer
  - Low spreads
  - High liquidity
- Issue of fees has been left to the side (but you might consider the effective spread as the bid ask spread + fees)

# Why is it so hard to find publicly listed bonds?




- The Microstructure of the Bond Market in the 20th Century (Bruno Biais and Richard Green)




- Bonds have overwhelmingly moved to OTC market Why?
- A bit of a mystery, combination of path dependence, rise of institutional investors, and preference by individual investors for holding bond funds over individual bonds
- Pb this is also true for stocks

# From secondary market to primary market

- Ways to create new securities
  - Private placement
    - With trading restrictions (owners cant resell)—eg venture capital
    - With OTC trading
  - Initial (or secondary) public offering
    - By subscription
    - With an underwriting
- Securities law regulates *any* security that is offered to the public
  - Requirements limited before 1900 everywhere and have grown more important since then with major inflection in U.S. with creation of Securities and Exchange commission
  - Goal is to reduce the likelihood that investors will be taken advantage of by issuers or by intermediaries
  - So two key distinctions. Trade or no Trade, IPO or no IPO
  - Key pt is that Public Offering raise costs to firms
- Focus on IPO

# Process

- Firm decides
  - To go public (e.g. Twitter)…Initial Public Offering coming soon.
  - To issue new securities (e.g. Apple issued $20 billion dollars of bonds last year)
- Hires an investment bank who
  - Should do some due diligence about the firms future revenue prospects and current balance sheet (value the firm—in a NPV way)
  - Find some buyers (build a book)

# Underwriting

- Left undecided is IPO price.
- Investment banks have complicated incentives
  - They are hired by the issuer and so to attract future issuers they would like to have 'high' IPO prices
  - Issuers want their money quickly so they would like the investment bank to find buyers for the issue quickly. So price is not everything.
  - They have to place the assets and their life is made easier in this respect if IPO prices are "low."
- Solution is underwriting
  - Becomes common in the 19$^{th}$ century
  - Investment Bank sets price and "buys" all the shares at the IPO price and it gets a commission proportional to the value the issue. The more shares it places with the public the faster it can free up is capital to do another IPO.

# Underwriting

- Underwriting is in fact an insurance contract:
  - if the issue is over subscribed, the investment bank is just a pass through.
  - If the issue is undersubscribed, the investment banks has to keep the balance of the shares
- This is an expensive contract
  - In the US IPO fees are about 7% of issue value for firms issuing less than $500 Million and about 5.1% for issues above that
  - In Europe IPO fees are about 4% of issue value for firms issuing less than $500 Million and about 2.5% for issues above that
  - See: Abrahamson, Jenkinson and Jones, “Why don’t US Issuers Demand European Fees for IPOs?” Journal of Finance ,forthcoming

# Underwriters

- Very concentrated, very profitable business
  - Issues are almost systematically over subscribed (so the insurance is 'never' paid).
- The same 8 firms received 81% of all IPO proceeds in the US and 63% of all IPO business in Europe.
- Expertise?
  - Doing these deals is complicated and there are not that many (200 a year or so in US and 100 or so in Europe) so why disperse the expertise
- Reputation?
  - Both sides (issuers and investors) know less about the process than the intermediary. The only way the process can be sustained is if reputation matters, otherwise intermediary will take advantage of one side or the other
- Market power?

# Private placement

- The New York Times Company said Monday it had reached an agreement with the Mexican billionaire Carlos Slim Helú for a $250 million loan intended to help the newspaper company finance its businesses…Mr. Slim, who already owns 6.9 percent of the Times Company, would invest $250 million in the form of six-year notes with warrants that are convertible into common shares,[…]The notes also carry a 14 percent interest rate, with 11 percent paid in cash and 3 percent in additional bonds. (NYT January 14 2009)
  - Things to notice, NYT a publicly traded company gets financing from a private source (mostly bonds) but Slim also gets the rights to buy additional shares of common stock
- The New York Times Company said Wednesday that it would pay back the $250 million loan from Carlos Slim Helú, a Mexican telecommunications billionaire, on Aug. 15, freeing itself from one of its larger financial obligations (NYT July 13 2011).
  - The reimbursement is early (and there is a prepayment penalty). But the NY Times.
- Why do this at all?

# Private placement is common

- For equity:
  - Venture capital
  - Joint ventures
    - Verizon wireless is jointly owned by Verizon (55%) and by Vodafone (45%)
    - Verizon will buy them out $59 billion in cash to Vodafone, and $60 billion in shares that will go to vodafone shareholders.
    - Could have simply returned all the cash to Vodafone shareholders,or given Vodafone a 120 billion dollar stake in Verizon (market cap $134 B)
  - Mergers and acquisitions
    - Cross ownership (Renault owns 43% Nissan and Nissan own 15% of Renault)
    - Dupont used to own a large stake in GM (1919-1961 about 23%). Seagram owned 25% of Dupont (1981-1995)…
    - More common outside the US
- For bonds
  - See above, but firms get a lot of finance from banks
  - Simpler and faster.

# Next time

- 10-09 Class 4: Modern Finance?
- **Financial axioms vs behavioral finance and imperfect markets;**
- **Axioms**
  - **Financial markets are competitive:**
  - **Value additivity;**
  - **No Free Lunch;**
  - **Markets are efficient**
- **Some problems with these axioms**
  - **Market impact**
  - **IPO performance**