Quantitative Investments

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Recall

Last lecture we discussed asset classes.

- More than just “stocks and bonds;”
- Importance: differences in behavior, legal treatment;
- Briefly covered hard assets (real estate, commodities);
- Talked about wide range of fixed income investments;
- Explored equities and corporate actions; and,
- Covered derivatives and indices.

Today we will talk about basic ideas of markets.
How Markets Work

Chapter 3, *A Quantitative Primer on Investments with R*
This part discusses how markets work. Specifically:

- Security issuance;
- Market structures;
- Orders and post-trade issues;
- Short sales; and,
- Regulation.

*Market microstructure* is the detailed study of how markets work.
The Primary Market
Primary Market

- The primary market is where securities are issued (sold).
  - Investors must choose (and be chosen) to participate.
  - The primary market exists to raise/borrow capital.
  - The secondary market is where issued securities are traded.

- New securities may be issued in a few ways:
  - Private placement (PP): issued only to “accredited investors.”
  - Initial public offering (IPO): sells stock in firm to public.
  - A company may spin-off a part of itself to shareholders.
  - Seasoned issue: when a public company issues more securities.

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2 Accredited investors: $1+MM net worth (exc. home), or $200k ($300k joint) income last 2 years.
**Investment Banking**

- *Venture capitalists* invest in young, pre-IPO firms.
- *Investment bankers* organize public offerings, PPs, M&A.
- Bankers responsible for an offering *underwrite* the deal.
  - Purchase offering, arrange firm commitments for resale.
  - Often form a *syndicate* to coordinate resale, share deal risk.
- Syndicate often places a *tombstone* to announce the offering.
- *Offering documents* describe security being issued, issuer.
  - Also list investment risks (mundane to outlandish/troubling).
- The preliminary documents are called a *red herring*.
- The approved documents are called the *prospectus*. 
Offering Details

- Initial public offerings (IPOs) are sold to the public.
  - Underwriters typically organize a *road show*.
  - Road show promotes security, informs potential investors.
  - Road show also helps underwriters gauge interest, pricing.
  - *Bookbuilding* is the collecting of indications of interest.

- Private placements: sold directly to accredited investors.
  - Often called “144A” securities for the SEC rule allowing them.
  - Cheaper to issue: no road shows or extensive documents.
  - Cannot be traded openly like common stock.
Seasoned Offerings

- Seasoned offerings occur after an IPO.
- Companies might *shelf register* securities.
  - Securities are registered, gradually sold for up to 2 years.
  - Less expensive than a large public offering.
- Companies also may issue stock held by their treasury.
  - Often in response to exercise of a warrant or convertible bond.
- Some companies issue more shares via a *rights* issue.
  - Rights are given to current shareholders.
  - Allow purchase of additional (new) shares at a set price.
  - Thus rights are similar to warrants.
Secondary Markets
Markets are not all the same, nor should they be.

Different market structures accommodate differences in:
- flexibility;
- fungibility; and,
- liquidity.

We can classify markets broadly (in increasing liquidity) as:
- Direct Search
- Over-the-Counter (OTC)
- Auctions
- Sporadic Call Markets
- Continuous Trading
Direct search markets: highly illiquid; crudest of markets, e.g.:
- Buying something via craigslist.com.
- Asking friends who can loan you $30 for beer.
- Moe and Joe...seeking to trade “blow”...
OTC Markets

- OTC markets exist when liquidity is low/flexibility is crucial.
  - Swaps used to finance baskets of stocks;
  - Tranches of a CDO or CMO;
  - Mortgages on houses.
- Thus OTC markets often occur over the phone or face-to-face.
- OTC trades: between parties, may be custom contracts.
- Thus OTC markets are sources of counterparty risk.
Auctions and Sporadic Call Markets

- Auctions may be used in the primary market:
  - US Treasuries, WR Hambrecht’s OpenIPO, emissions caps.
- Auctions are used in secondary markets also:
  - Day/session opening and closing equity prices.
  - Intraday if big news, high volume or volatility.
- Auctions are studied by economists using game theory (OR).
  - Typically classified as one- or two-sided, aka “fixings.”
- Some markets conduct regular “call markets” (i.e. auctions).
  - Frequent auctions approximate continuous trading? Sort of.
  - Examples: LME, some illiquid Euronext stocks, dark pools.
  - Dark pools: no pre-auction data; e.g. ITG’s POSIT (since 1987).
Continuous Trading

- **Market hours**: the time between open and close times.
- **Continuous trading**: during market hours; trading at any time.
  - Focus of most news, research; about 80% of volume.
- In the US, market hours vary for different markets:
  - Equities: 9:30–16:00 NY time (8:30–15:00 Chicago).
  - US Treasuries: 24 hrs/day (more liquid 8:00-16:00 NY time).
  - FX: Always open; most active currencies vary by time of day.
  - Non-Ag futures: Sun 17:00–Fri 16:00, exc. 16:00–17:00 Chicago.\(^3\)
  - Ag futures: Sun 19:00–Fri 13:20, exc. 7:45–8:30, 13:20–19:00 Chicago.
- Futures are nearly 24 hours/day because they are used worldwide.

\(^3\)Index futures also pause 15:15–15:30.
Many stock exchanges started as order-driven markets.

One problem: Orders might not always match:
- Market would then function only sporadically.
- Lower volume would dissuade investors from trading there.

Solution? “Hire” someone to watch market:
- Ensure it is “fair and orderly.”
- Constantly quote a bid and ask.
- Also provide liquidity as needed⁴.

This person is called a specialist.

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⁴⚠️ Dikkat! This means seeing all orders.
Expressing want: we can be attracted, repelled, or indifferent.
Thus orders can be to buy or sell (or might not exist).
Regulations in many countries constrain short sales.
May even need to specify if a buy covers a short position.
Thus there are more than just two types of orders.
In US equity markets, there are four basic order types: Buy (B); Sell (S); Sell Short (SS); and, Sell Short Exempt\(^5\) (SSE).

SSE’s are used by official market makers to sell short: without borrowing the security; and, (erstwhile) without being subject to a price test. Thus they exist to increase liquidity.

\(^5\)Under Reg SHO, SSE’s are merely markings.
Orders: Price Immediacy

Orders may trade immediacy for price sensitivity.

- *Market* orders execute immediately against “far side.”
- *Limit* orders specify worst acceptable price.
  - *Marketable limit* orders should execute immediately.
- *Market if touched*: activate at near price, *e.g.* exit at profit.
- *Stop* (loss): activate at far price, *e.g.* exit at loss.
Market orders do not persist; they trade, then go away.

Quotes are collections of active limit orders.

- Buy orders are collected by price and become bids;
- Sell\(^6\) orders are collected by price and become offers/asks.

So quotes are prices at which people stand ready to buy/sell.

A limit order book ("book"):  
- is the total amount at each price for standing limit orders.  
- changes if a limit order is received, corrected, canceled, filled.  
- often excludes non-“standard-way” orders.
- may show individual order amounts at each price level.

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\(^6\)Including sell short.
The highest bid amongst a set is the best bid.
The lowest offer amongst a set is the best offer.
Together these are the best bid and offer (BBO).
BBO across all market centers: national BBO (NBBO).
NBBO is better known as the spread or the inside market.
If you buy/sell:
- the best bid/ask is the near side of the spread; and,
- the best ask/bid is the far side of the spread.
In the UK, the spread is often called the touch.
Non-market orders may exist for a specified time period.

- *Good-till-canceled* (GTC) orders stay active\(^7\) until canceled.
- *Day* orders are canceled after the close/closing auction.
- *Immediate or cancel*\(^8\) (IOC), NOW orders.
  - Canceled after trading (or not) against book/CLOB\(_{\text{fast}}\).
- Market auction orders may trade at any price:
  - *Market on open*\(^9\) (MOO/OPG), *Market on close* (MOC).
- Limit auction orders may trade at limit price or better.
- Imbalance only (IO) orders\(^{10}\) trade against auction imbalances.

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\(^7\)Some brokers limit how long GTCs live.
\(^8\)LSE calls these execute or eliminate (EOE) orders.
\(^9\)Market orders sent pre-open will MOO.
\(^{10}\)Only available in Nasdaq open/close.
Market Intermediaries

- Some actors in secondary markets are intermediaries.
  - They may *broker* trades by matching buyers and sellers.
  - They may *deal* with just a buyer or seller.
- Brokering involves acting as an *agent*.
  - Must represent each customer’s interests (fiduciary duty).
- Dealers act for their own (*principal*, *proprietary*) interest.
- There are also inter-broker dealers.
- Often, full-service investment firms are “broker-dealers.”
Intermediation and Order Responsibility

- Must mark orders as agency or principal.
- *Held* orders require “best execution.” (“agency” default)
- *Not held* orders give discretion to work the order.
- Order handling rules: fill agency before principal orders.
  - May not apply to odd-lot, block-size; across venues.
  - OTC bond markets: order handling is even more nebulous.
- *Front running*: agent favors principal over agency orders.
  - SEC, MiFiD\(^\text{11}\) view this as a very serious offense.

\(^{11}\)The EU Markets in Financial Instruments Directive.
Money and securities rarely transfer immediately after a trade.

Money moves from buyer to seller at settlement.

- USEq, UST, JPEq, UKEq: T+2\(^{12}\), Futures: T+0\(^{13}\)

Securities move from buyer to seller at delivery.

Settlement and delivery usually occurs at the same time.

Why not settle same-day (T+0)? Confirms need manual attention.

Can specify non-standard settlement + delivery, but:

- Not “regular way” \(\Rightarrow\) different, less-liquid market.

Sometimes can specify different settlement, delivery dates.

- Same as an unsecured, no-doc, no-questions-asked loan.

\(^{12}\) CREST fines participants if <98% of trades settle by T+1.

\(^{13}\) Why?
Selling short first requires borrowing securities from somebody.
Most firms require that you get *locates* (find shares to borrow).
You then sell those securities.
Later, you buy securities back and return them to the lender.
Short selling brouhaha a few years ago was about this.
- Some traders shorted “naked” (without locates).
- They then covered their shorts before delivery.
- SEC required some shorts (banks) to have unique locates.
Selling Short: Foolish Controversy

Short selling is often controversial.

- Profit when a security/market declines in value (unpatriotic?).
- Has often been restricted, even in the US (via price tests).
- Even now: inconsistent attitude to shorts is stunning.
  - We blame shorts for bringing down bank stocks.
  - Who is thanking speculators for falling oil prices?
- Short selling rewards investors for exposing problems.
  - That oversight guides market prices toward fair value\(^{14}\).
- You cannot stop short selling:
  - Short exposure can also be had via swaps or options.
  - For indexed securities, you can synthetically short.

\(^{14}\)Representative prices attract more investors.
Regulation
1933  **Securities Act**: must register, disclose relevant info before issuing securities.

1933  **Banking (Glass-Steagall) Act** barred commercial banks from investment banking, brokerage; created *FDIC*.

1934  **Securities Exchange Act**: must register publicly-traded companies, report financials periodically; created *SEC*.

1936  **Commodities Exchange Act** regulates futures, commodities, commodities options trading.

1938  **Maloney Act** authorizes self-regulatory organizations (SROs).\(^\text{15}\)

1939  **Trust Indenture Act** requires debt issued w/indenture, regular financial reports, independent overseer.

\(^{15}\)Why are SROs good?
1940 *Investment Company Act* requires registration, regulation by SEC; sets operating standards (incl. for short sales).

1940 *Investment Advisers Act*: advisers must register w/SEC, disclose conflicts of interest.

1956 *Bank Holding Company Act* required BHCs to register w/Fed; prohibits non-bank activities at subsidiaries.


1970 *Securities Investor Protection Act* protects investors vs misappropriation, brokerage failure; created *SIPC*.

1974 *Commodity Futures Trading Commission Act* created *CFTC*; allows creation of SRO.

1982 *Shad-Johnson Accord*: prohibited futures on stocks, narrow-based indices (SEC, CFTC “turf” detente).

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\(^{16}\) E.B.
We have covered market basics; on to modern markets next time!

- Fundamentals: Modern Markets, Efficiency;
- Measuring: Returns, Risk, and Diversification;
- Valuation: Fixed Income, Yield Curves, Equity Valuation;
- Valuation II: Factor Models, Microfoundations, Global Investing, FX;
- Risk Alleviation: Futures, Options, Credit, Structured Products; and,
- All Together Now: Active Portfolios, Investment Firms, Crises.