Topics of this lecture

• Overview of financial instruments, market conventions and price quotations
  - debt & money markets securities and derivatives
  - equity securities and equity derivatives
  - foreign exchange contracts
  - credit derivatives
  - hybrid securities
  - exotics

- Yield curve analytics

- Risk history in a nutshell: from Duration to $\text{VAR}^2$
Treasury Securities - Discount securities

T Bills are promises of the U.S. Treasury to pay a stipulated amount (face value) on a stated maturity date

No intermediate payments
Maturity - 91 days, 182 days, 364 days
Quoted on a discount rate basis:

\[ i = \frac{365}{n} \left( \frac{100}{P} - 1 \right) \]

The bond equivalent yield:

\[ d = \frac{360}{n} \left( \frac{100}{P} - 1 \right) \]

The continuously compounded Yield:

\[ r = \frac{365}{n} \ln \left( \frac{100}{P} \right) \]
Treasury Securities - Coupon Instruments

Quoted on a Price basis (usually in 32nds of 1 percent)
Yield to maturity - IRR of the issue (assumes continuous reinvestment of coupon at same rate)

\[ P = \sum_{j=1}^{m[n/2]} \frac{m[n/2]Cp(100)}{(1 + m[n/2] Rm)^{mn/2}} + \frac{100 + m[n/2]Cp(100)}{(1 + m[n/2] Rm)^{mn/2}} \]

\( m = 2 \) in the U.S, 1 in Europe

Conversion of semi-annual yield into continuous yield:

\[ 1 + \frac{1}{2} Rm = \exp \left[ \frac{r}{2} \right] \]

Relationship btw. coupon yields, current yields and ytm:

\[ R_{cr} = R_{cp} \times (100/P) \]

\[ P = 100 \left[ \frac{R_{cp}}{Rm} + \frac{1}{(1 + \frac{1}{2} Rm)^n} \right] \]
Corporate Securities

Capital Markets funding vs. Private funding:

Adv. of Cap. Mkts. Funding

- standardized product
- market making by financial institutions, therefore objective price finding in secondary markets
- liquid, therefore theoretically cheaper for issuer, but Germany???

Adv. of private market funding

- tailor made for issuer’s needs
- avoid hassle of registration with SEC or other
Corporate Securities - CPs

Commercial Paper - unsecured short term corporate debt

Quoted on a discount basis like T bills

 Typically under one year (else to be registered with the SEC)

Discount rate computed on 360 day assumption

Can be placed directly, via broker dealers or under ECP, MTN or EMTN programs

Secondary market, either via broker dealers, underwriters or corporations themselves
Corporate Securities - Coupon Issues

Principal (ex. $1000) + Coupon (semi annual in U.S.; annual in Europe)
Specifics covered by indenture provisions, specified in underwriting prospectus:
  - sinking fund
  - call
  - put
  - convertible option
  - step up; down

Special cases: zero coupons, floating rate notes, credit enhancement facilities; principal protection notes; etc.

Senior, first mortgage, subordinated, mezzanine, traunches of mortgage pooled securities
Corporate securities - Equity Issues

Equity securities represent a claim on corporate earnings and assets subordinated to the claims of all creditors.

Common stock - dividend is not a contractual commitment. Preferred stock - dividends are contractually committed and paid before common stock dividends are paid out; typically cumulated, i.e. all arrearages must be paid out prior to the payment of common stock dividends.

Preferred stock have a par value (in some cases a redemption value), in some cases mandatory - therefore are valued much like fixed income instruments.
Valuation of Equity Issues

Comparable Valuation based on multiples:
- P/E ratios
- EBIT & EBITD
- comparable M&A transaction multiples
- operating income ratios
- etc.

CAPM (see last lecture) \[ r_i = r_f + \beta_{i,m}(r_m - r_f) \]

Cash flow discount model (Gordon): \[ P = \sum_{j=0}^{\infty} \frac{CF_j}{(1+r)^j} \]

What’s the appropriate r???
Bank Liabilities

Certificates of Deposit (CDs)- interest bearing as opposed to Tbills & CP which are discount based
CDs are negotiable, interest paid based on a 360 days convention

\[ p_{cd} = \frac{V}{1 + ni/360} \]

\( V \) is percent of face value; n days to maturity; i is quoted yield

Letters of Credit (LCs), interbank loans; Borrowing facilities

REPOS & Reverse REPOs (also third party REPOS)

Collateralized loan facilities where a bank (also other market participant) sells securities to a creditor and simultaneously agrees to buy back those securities at a later date for the same price + interest to cover the use of funds
Interest Rate & Currency Swaps

X (AAA) <-> Y (A)
Euromarket <-> Bank Loan

Comp. advantage

9.5% LIBOR
9.0% $100

9.0% LIBOR+25 bp $100

$100

Swaps via swap arranger

- X (AAA) pays 10 bp to the Swap Arranger.
- Y (A) pays 10 bp to the Swap Arranger.
- Swap Arranger charges a fee of 9.5%.
- LIBOR + 25 bp is paid by Y (A) to bank loan.
- LIBOR + 9% is paid by X (AAA) to Euromarket.
Swaps by interposing a swap dealer

<table>
<thead>
<tr>
<th>Bank</th>
<th>LIBOR</th>
<th>9.4%</th>
<th>LIBOR</th>
<th>9.6%</th>
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<tbody>
<tr>
<td>X (AAA)</td>
<td>LIBOR</td>
<td>9.0%</td>
<td>Y (A)</td>
<td>LIBOR + 25 bp</td>
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<td>Euromarket</td>
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<td>Bank Loan</td>
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Swap Terminology

Notional amount
Coupon
Term
Trade date
Settlement date or effective date
Reset date
Reset Frequency
Maturity date
at Market (at the money)
off market