The Financial Environment: Interest Rates

BUSS207 Financial Management

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Cost of Money

- What do we call the price, or cost, of debt capital?

- What do we call the price, or cost, of equity capital?

What four factors affect the cost of money?

- Production Opportunities

- Time Preferences for Consumption

- Risk

- Expected Inflation

"Real" versus "nominal" rates

k* = real risk-free rate. T-Bond rate if no inflation; 1% to 4%

k = any nominal rate.

k_{RF}= rate on T-securities. Known as the nominal risk-free rate

$$k = k* + IP + DRP + LP + MRP$$

,where: k* = Real risk-free rate

IP = Inflation premium

DRP = Default risk premium

LP = Liquidity premium

MRP = Maturity risk premium

"Real" versus "nominal" rates-cont'd…

- Note:

  Fisher Effect: $1 + k = (1+r)*(1+h)$

  ,where k=nominal rate, r=real rate, and h=inflation rate

  $$k = r + h + r*h \approx r+h$$

Premiums Added to k* for Different Types of Debt:

- **S-T treasury:**

- **L-T treasury:**

- **S-T corporate:**
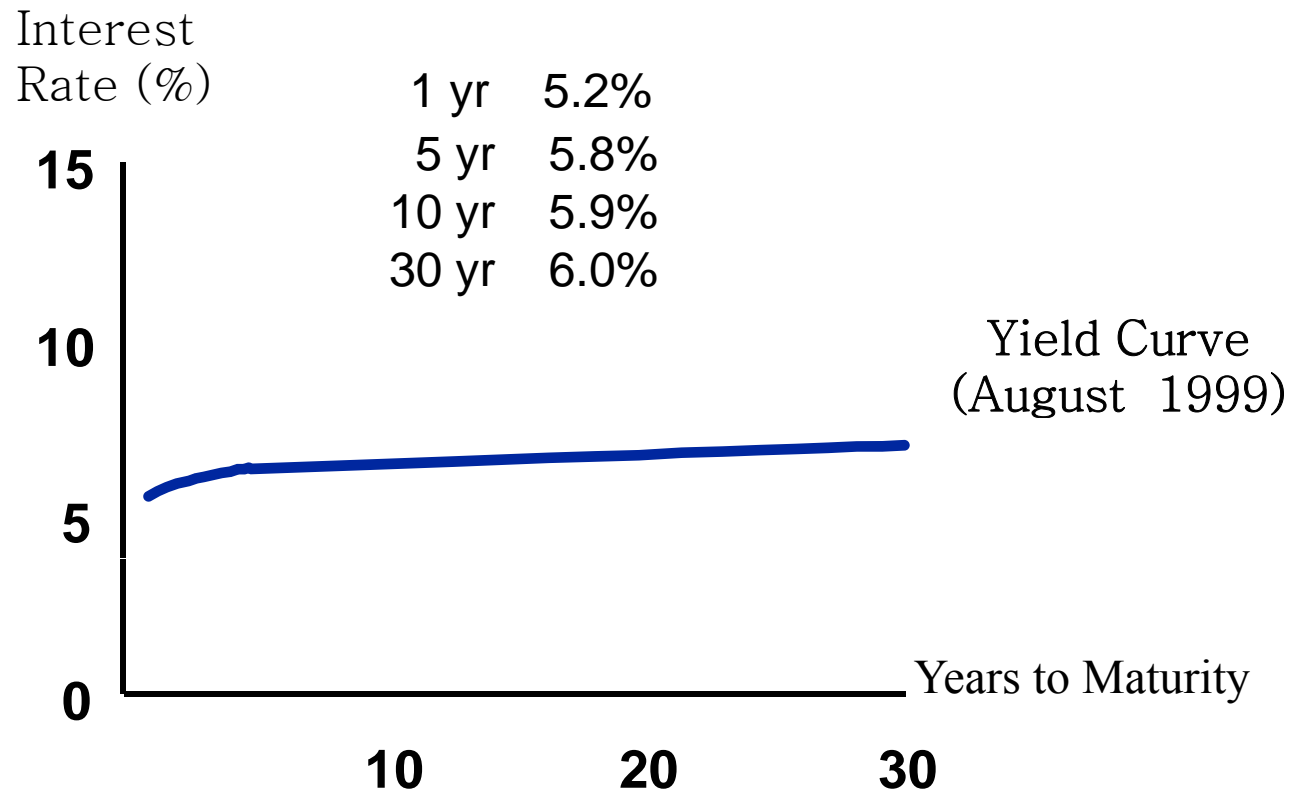
- **L-T corporate:**

Term structure

What is the "term structure of interest rates"? What is a "yield curve"?

- Term structure:

Term structure - cont'd...

- A graph of the term structure is called the yield curve.

Interest
Rate (%)

1 yr	5.2%
5 yr	5.8%
10 yr	5.9%
30 yr	6.0%

Yield Curve
(August 1999)

Years to Maturity

15

10

5

0

10   20   30

What 3 Theories Are Used to Explain the Shape of the Yield Curve?

1. Pure Expectations Hypothesis (PEH)

2. Liquidity Preference Theory

3. Market Segmentation

Pure Expectations Hypothesis (PEH)

— Shape of curve depends on investors' expectations about future inflation rates.

— If inflation is expected to increase, S-T rates will be low, L-T rates high, and vice versa. Thus, the yield curve can slope up or down.

— Long-term rates are an average of current and future short-term rates

— If PEH is correct, you can use the yield curve to back out expected future interest rates

— PEH assumes that MRP = 0

— Assumes investors are indifferent between maturity lengths over their desired holding period as long as their return is expected to be the same over this time period.

Pure Expectations Hypothesis (PEH)-cont'd…

- Suppose we observe the followings

Maturity	Yield
1 year	6.0%
2 years	6.2%
3 years	6.4%
4 years	6.5%
5 years	6.5%

Liquidity Preference Theory

— Some argue that the PEH isn't correct, because securities of different maturities have different risk (MRP).

— Lenders prefer S-T securities because they are less risky.

— Investors demand a MRP to get them to hold L-T securities (i.e., MRP > 0).

— Thus, S-T rates should be low and the yield curve should be upward sloping.
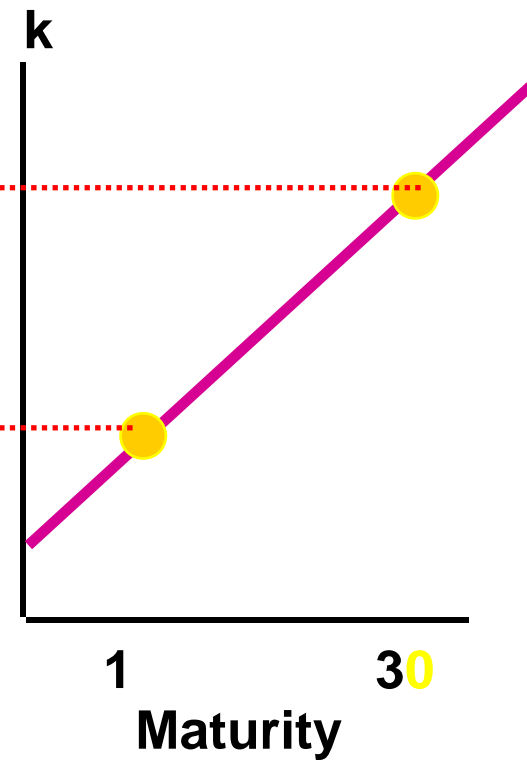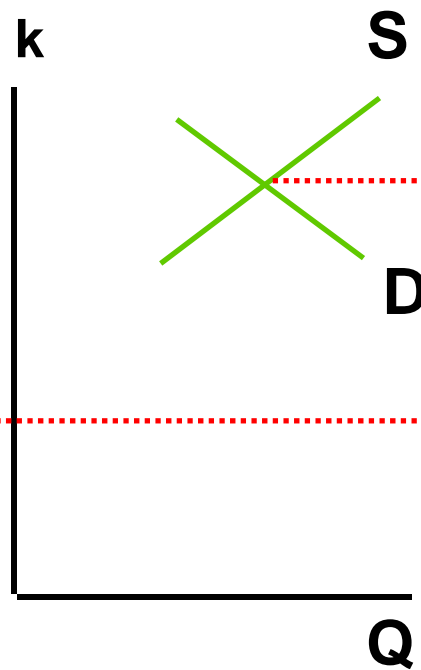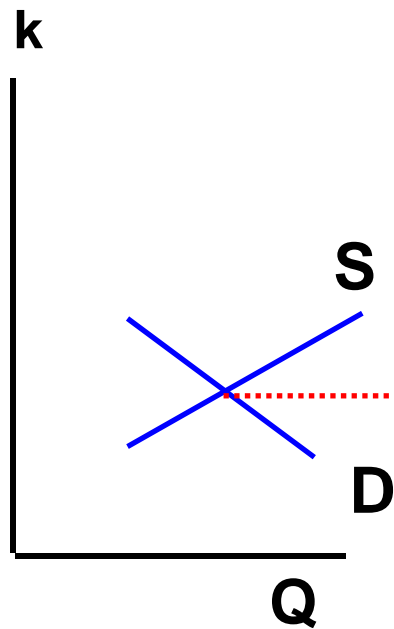
Market Segmentation

— Borrowers and lenders have preferred maturities.

— Slope of yield curve depends on supply and demand for funds in both the L-T and S-T markets (curve could be flat, upward, or downward sloping)

Market Segmentation-cont'd...

1-yr

30-yr

Yield curve

k

k   **S**

k

S

D

D

Q

Q

1   **30**

Maturity

Example

Inflation for Yr 1 is 5%.

Inflation for Yr 2 is 6%.

Inflation for Yr 3 and beyond is 8%.

$k* = 3\%$

$MRP_t = 0.1\%(t-1)$

Constructing the Yield Curve,

Example-cont'd…

Step 1: Find the average expected inflation rate over years 1 to N:

$$IP_N = \frac{\sum\limits_{t=1}^{N} INFL_t}{N}$$

$IP_1 \quad =$

$IP_{10} \quad =$

$IP_{20} \quad =$

Must earn these IPs to break even vs. inflation; these IPs would permit you to earn k* (before taxes).

Example-cont'd…

Step 2: Find MRP based on this equation:

$$MRP_t = 0.1\% \, (t - 1)$$

$MRP_1 \quad =$

$MRP_{10} \quad =$

$MRP_{20} \quad =$

Example-cont'd…

Step 3: Add the IPs and MRPs to k*:

$k_{RFt} = k* + IP_t + MRP_t$

k_{RFt} = Quoted market interest rate on treasury securities.

Assume k* = 3%:

1-yr   : k_{RF1} =
10-yr   : k_{RF10} =
20-yr   : k_{RF20} =

Example-cont'd…

Yield curves:

Interest
Rate (%)

Continental
Airlines (Junk)

Exxon (AAA)

Treasury
yield curve

12.7%

11.4%

8.0%

0   1   5   10   15   20