

# Bonds & Stock Market (2/15/2011)

Econ 310-008

## Equations

- $i_{nt} = (i_t + i_{t+1}^e + i_{t+2}^e + \dots + i_{t+(n-1)}^e)/n$  Expectations formula
- $i_{nt} = (i_t + i_{t+1}^e + i_{t+2}^e + \dots + i_{t+(n-1)}^e)/n + l_{nt}$  Liquidity premium formula
- $p_0 = D_1/(1 + k_e) + p_1/(1 + k_e)$  One-Period Stock Valuation Model
- $p_0 = D_1/(1 + k_e)^1 + D_2/(1 + k_e)^2 + \dots + D_n/(1 + k_e)^n + p_n^e/(1 + k_e)^n$  Dividend Valuation Model
  - fundamentals:  $D_1/(1 + k_e)^1 + \dots + D_n/(1 + k_e)^n$
  - bubble:  $p_n^e/(1 + k_e)^n$
- $p_0 = \sum D_t/(1 + k_e)^t$  Dividend Valuation Model without final sale
- $p_0 = D_0(1 + g)^1/(1 + k_e)^1 + D_0(1 + g)^2/(1 + k_e)^2 + \dots + D_0(1 + g)^\infty/(1 + k_e)^\infty$  Gordon Growth Model
- $p_0 = D_0(1 + g)/(k_e - g) = D_1/(k_e - g)$  Gordon Growth Model (simplified)

## Definitions

- **risk structure of interest rates** – the relationship among the interest rates on various bonds with the same term to maturity
- **term structure of interest rates** – the relationship among the interest rates on various bonds with different terms to maturity
- **default** – party issuing debt instrument is unable to make interest payments or pay off the amount owed at maturity
- **default-free bonds** – bonds with no default risk
- **risk premium** – interest rate spread between bonds with default risk and default-free bonds
- **yield curve** – plot of the yields of bonds with differing terms to maturity but the same risk structure (risk, liquidity, and tax considerations)
- **inverted yield curve** – downward sloping yield curve
- **expectations theory** – the interest rate of a long-term bond will equal the average of short-term interest rates people expect over the life of the long-term bond
  - Assumption: Bonds of different maturities are perfect substitutes.
  - Implication: Re on bonds of different maturities are equal.
- **segmented markets theory** – markets for different maturity bonds are completely separate; interest rates are determined by supply and demand for that bond only
  - Assumption: Bonds of different maturities are not substitutes.
  - Implication: Interest rate at each maturity determined separately.
- **liquidity premium theory** – the interest rate of a long-term bond will equal the average of short-term interest rates people expect over the life of the long-term bond plus a liquidity premium
  - Assumption: Bonds of different maturities are substitutes, but not perfect substitutes.
  - Implication: Modifies expectations theory with features of segmented markets theory.
- **adaptive expectations** – expectations are formed from past experience only
- **rational expectations** – expectations will be identical to optimal forecasts (the best guess of the future) using all available information
- **arbitrage** – market participants eliminate unexploited profit opportunities
- **efficient market hypothesis** – applies rational expectations to financial markets; stock prices reflect all available information
  - weak form – stock prices reflect past stock price history
  - semi-strong form – stock prices reflect all publicly available information
  - strong form – stock prices reflect all information (public and insider)

## Variable definitions

- $i_t \equiv$  interest rate on one-period bond
- $i_{t+1}^e \equiv$  expected interest rate on one-period bond next period
- $i_{2t} \equiv$  interest rate on two-period bond
- $l_{nt} \equiv$  liquidity premium for n-period bond at time t
- $p_0 \equiv$  current price of stock
- $D_1 \equiv$  dividend paid for year 1
- $k_e \equiv$  required return in equity
- $p_1 \equiv$  stock price at the end of year 1
- $D_0 \equiv$  most recent dividend paid
- $g \equiv$  expected constant growth rate

## Principles

- Government bonds are not necessarily default-free.
- Default risk, liquidity, & tax treatment are relative to alternative assets.
- A bond with a default risk will always have a positive risk premium.
- Credit rating agencies rate the quality of bonds by probability of default (AAA default less than CCC).
- Junk bonds often facilitated leveraged buyouts, increasing firm productivity.
- Income from municipal bonds is not taxed by the federal government due to state sovereignty reasons.
- $l_{nt}$  always positive, rises with maturity.
- Current stock values are the present discounted value of future dividends.
- Market price is set by the buyer willing to pay the most (buyer who can make best use of the asset).
- Superior information about an asset can increase its value by reducing its perceived risk.
- When new information is released about a firm, expectations and prices change.
- Rational expectations assumes agents use the same model as the researcher ("model-consistent").
- In rational expectations people can make mistakes, but they do not make systematic forecasting errors.
- Arbitrage is the mechanism tending toward the efficient market hypothesis.
- Efficient market holds even if there are some uninformed, irrational participants.

## Risk structure factors

- default risk:  $\text{risk}_B \uparrow \rightarrow B^D \downarrow \rightarrow P_B \downarrow$
- liquidity:  $\text{liquidity}_B \downarrow \rightarrow B^D \downarrow \rightarrow P_B \downarrow$
- income tax:  $\text{tax}_B \downarrow \rightarrow B^D \uparrow \rightarrow P_B \uparrow$

## Term structure empirical facts

1. interest rates on bonds of different maturities move together over time
2. low short-term interest rates usually mean upward sloping yield curves; high short-term interest rates usually mean downward sloping yield curves
3. yield curves almost always slope upward

## Term structure theories

- expectations theory: explains 1 & 2, not 3
- segmented markets theory: explains 3, not 1 & 2
- liquidity premium theory: explains 1, 2, & 3

## Setting prices

- uncertainty  $\uparrow \rightarrow k_e \uparrow \rightarrow p_0 \downarrow$
- economy growth  $\uparrow \rightarrow g \uparrow \rightarrow p_0 \uparrow$
- dividends  $\uparrow \rightarrow D_0 \uparrow \rightarrow p_0 \uparrow$

**Favorable evidence – efficient market hypothesis**

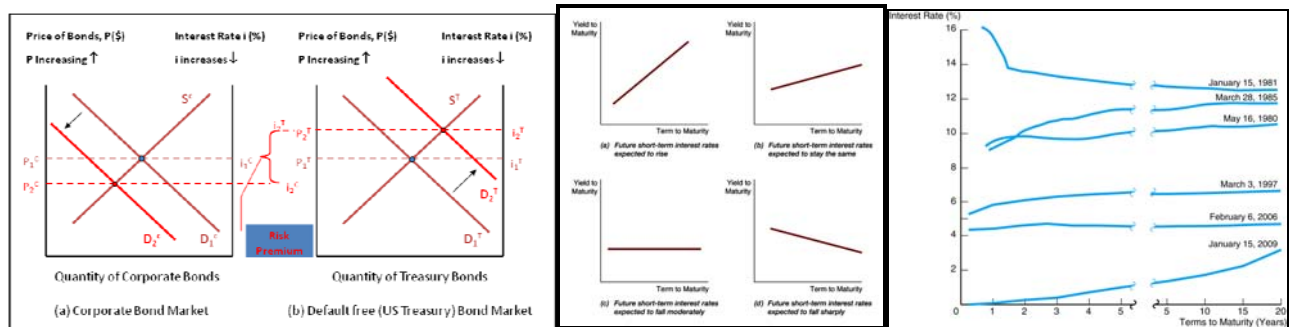
- Investment analysts and mutual funds don't beat the market
- Anticipated announcements don't affect stock price
- Stock prices close to random walk
- Technical analysis doesn't outperform market

**Unfavorable evidence – efficient market hypothesis**

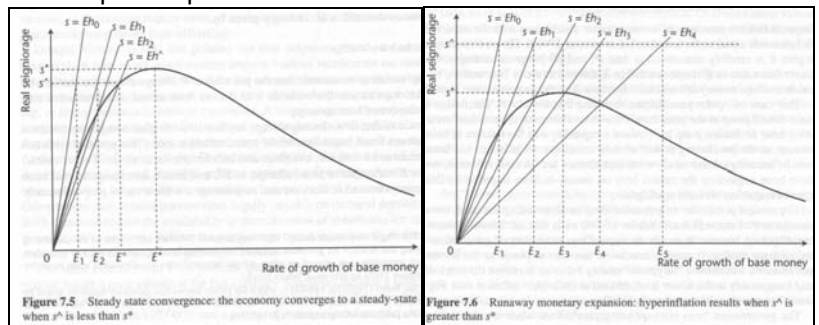
- Small-firm effect: small firms have abnormally high returns
- January effect: high returns in January
- Market overreaction
- Excessive volatility
- Mean reversion
- New information is not always immediately incorporated into prices

**Implications – efficient market hypothesis**

- Published reports of financial analysts not very valuable
- Should be skeptical of hot tips
- Stock prices may fall on good news
- Prescription for investor
  - Shouldn't try to outguess market
  - Buy and hold
  - Diversify with no-load mutual fund



Missed part of past notes:



normal inflation

hyperinflation