

Stocks, Bonds and Money

- Bond prices and interest rates
- The Determinants of Stock prices
- Money Demand

The Bond Market

- Large, well-established companies raise funds by issuing bonds directly to the public.
- A bond is a promise to repay a debt which usually includes the principal amount and coupon payments.
- The interest rate on a bond depends on:
 - Maturity (longer maturities require higher rates)
 - Risk of borrower (in bankruptcy, bondholder may not get paid)
 - Tax treatment (e.g. municipal bonds are tax free)

Bond prices are inversely related to interest rates.

- Consider a zero coupon bond with one year maturity.
- Pay P_{bond} today and get \$1000 in one year.
- The nominal interest rate paid on the bond is

$$i_b = (\$1000 - P_{\text{bond}}) / P_{\text{bond}}$$

Example: if $P_{\text{bond}} = \$910$, $i_b = 90/910 = 10\%$

if $P_{\text{bond}} = \$950$, $i_b = 50/950 = 5.2\%$

The Stock Market

- A share of stock is a claim to partial ownership of the firm.
- Public corporations can raise funds through the stock market.
- Stock prices depend on
 - The required rate of return of investors
 - The expected dividend payment.
 - The riskiness of the stock.

Determining stock prices: an example.

- Investors expect to earn the required return $r_s=5\%$. (This reflects the interest rate that can be earned on alternative assets such as bonds)
- Buy a stock today at price P_s .
- The stock pays \$100 in dividends over the next year and the expected price of the stock in one year is $P_s=\$1000$.

Determining stock prices (cont.)

- The gross rate of return on the stock is:
 $(\$100 + \$1000)/P_s$
- The gross rate of return required by investors is
 $1+r_s=1.05$
- Equating the gross rate of return on stocks to the gross rate of return required by investors gives
 $P_s=\$1100/(1.05) = \1047
- Stock price today =
 $(\text{Dividend} + \text{Expected price next period})/(1+r_s)$
- Conclusion:
If Dividends rise, stock prices rise.
If interest rates rise, stock prices fall.

An alternative way to look at stock prices

- Suppose dividend and interest rate is constant:

- $P_t = D/(1+r) + P_{t+1}/(1+r)$

- Solve forward:

- $P_t = D/(1+r) + D/(1+r)^2 + D/(1+r)^3 \dots$

- $P_t = (1/(1+r)) * D * [1 + 1/(1+r) + 1/(1+r)^2 + \dots]$

- Also:

- $[1 + 1/(1+r) + 1/(1+r)^2 + \dots] = (1+r)/r$

- So that

$$P_t = D/r$$

Stock prices continued:

With constant dividends:

$$P_t = D/r$$

If dividends grow at rate $g < r$ this becomes (approx):

$$P_t = D/(r-g)$$

- ** Higher expected growth in dividends increases stock prices.
- ** Lower interest rates increase stock prices

Is the stock market overvalued?

- A common yardstick: look at price/earnings ratio.
- In general, stocks trade at some multiple of earnings.
- Intuition: Stock prices reflect future earnings streams that will eventually be paid out in dividends. As earnings rise, stock prices should increase, maintaining a (relatively) constant P/E ratio.

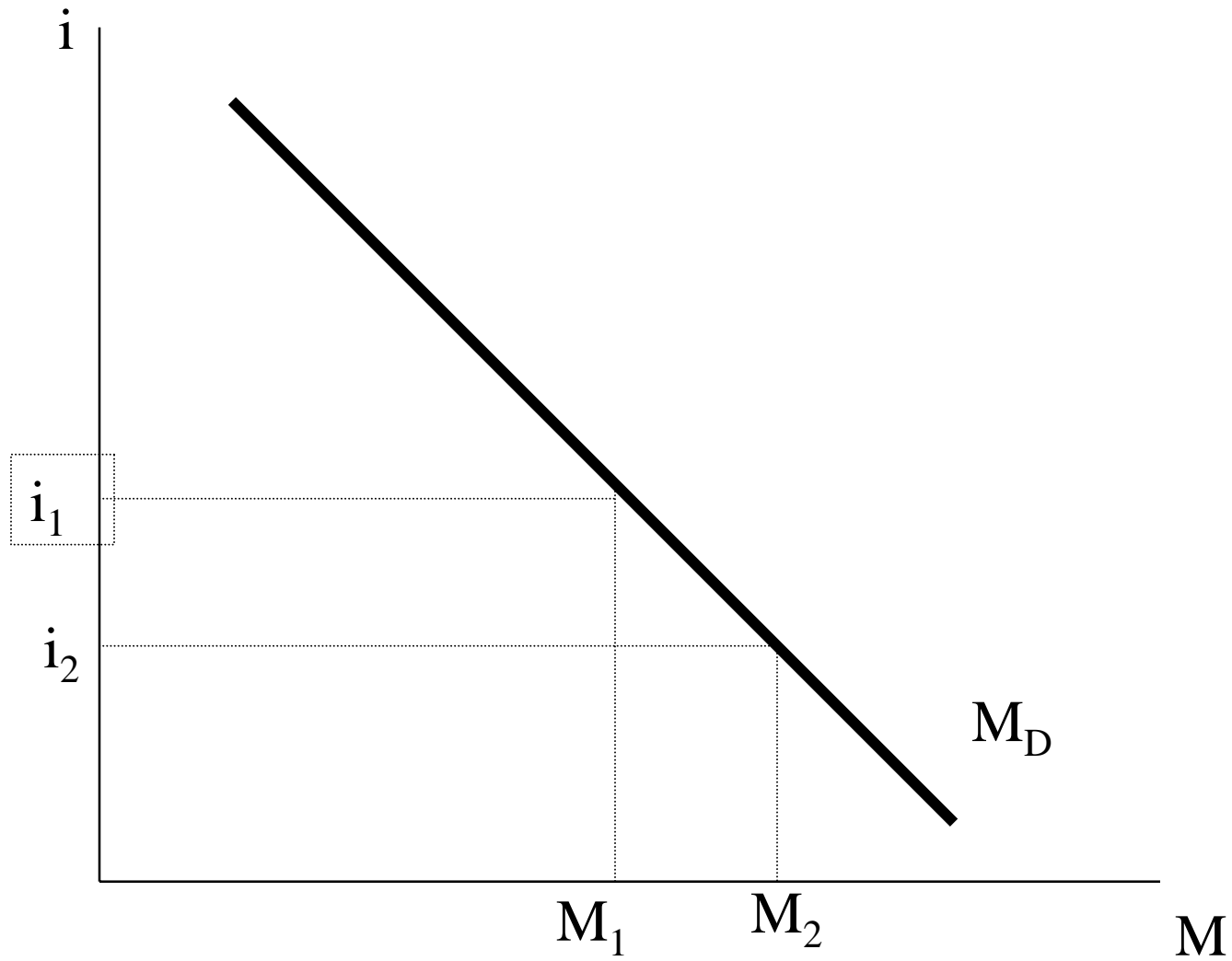
Stock market bubble in late 90's?

- Average P/E ratio of S&P 500 firms was 26 in December, 2000. Well above average P/E ratio of 22 over 1990-2000 period.
- P/E ratio for Nasdaq composite stock index was 98 near the end of 2000.
- Historically, P/E ratios are closer to 14-15.
- Possible consequences?

Money Demand

- Households and firms make portfolio decisions regarding how to allocate funds between money (low interest bearing assets used for transactions purposes) and stocks and bonds (higher interest bearing assets with no transactions purpose).
- The opportunity cost of holding money is the nominal interest rate (By holding money, one foregoes both the real interest rate earned on other assets, and one incurs the loss in purchasing power owing to inflation).
- As the interest rate falls, money demand increases.

Money Demand



Additional Determinants of Money Demand

- As nominal income rises, households make more transactions and money demand increases.
- Technological change in the financial sector (e.g. ATM machines) may lead to a reduction in money demand over time.
- Increases in money demand owing to these factors cause the money demand curve to shift out at any given nominal interest rate.

A shift in the demand for money

