I. Time value of money
   A. The rate at which we are willing to trade off purchasing power now rather than later.
      1. Borrowers are willing to pay back more later to spend now.
      2. Savers want more money later to give up spending now.
   B. If you are willing to give up $100 now to get $200 in 12 years, your implied time value of money is 6% per year.

II. Compounding vs discounting
   A. Compounding calculates the future value of money you invest now
   B. Discounting calculates the current value of money you will get in the future.
   C. Formulas (i = interest rate, where 10% is .10)
      1. FV \( (X, i, n) = X \times (1 + i)^n \)
      2. PV \( (X, i, n) = X / (1 + i)^n \)
   D. As the interest rate increases, the PV of future money will decrease.
   E. Quick rule = rule of 72
      1. Money will double in \( 72/i \) years.

III. Bond prices
   A. Bonds have a fixed face or par value = final payment, plus fixed interest payments = coupon payments (from days when you clipped coupons and redeemed them).
   B. If you buy an old bond in the secondary market, you will get any remaining coupon payments plus the face value. Compare what you paid to that income to get the rate of return, or yield to maturity.
      1. If face (par) value is greater than what you paid, you will get interest plus a capital gain. It was sold at a Discount from Par.
      2. If face value is less than what you paid, you will get interest but a capital loss.
   C. Suppose you have a bond issued with 6% interest payments. If the interest rate is 8% you will have to sell it at a discount to raise its yield to maturity up to 8%.
   D. Put another way, the market value of a bond is the discounted (present) value of future payments, using the current market interest rate.
   E. Summary: the current market value (price) of old bonds will vary inversely with the current market interest rate.

IV. Interest rate model
   A. Market for loanable funds, with both SSUs and DSUs responding to the interest rate.
   B. Sources of demand for loanable funds
      1. HH -- finance purchases of houses, autos, other durables
      2. Firms -- finance investment in P&E
3. Government -- finance deficits

4. All -- hold money balances for transactions purposes, that is, hold money and not loan it out.

C. Sources of supply of loanable funds

1. HH, firms and governments that have surpluses
2. Expansion of reserves and subsequent bank loans and money creation

D. While HH, firms and government (?) respond to the interest rate, shown as downward-sloping Demand curve, other factors can also change demand for loanable funds, such as current GDP, taxes and expectations (future income to pay it back and need for new capital) = shift in D curve

1. With higher current GDP there is also likely to be increased confidence in future. More likely to borrow if think can pay it back.
2. With higher current GDP also need more money balances for transactions. Rather than loan it to someone else, you are holding it for yourself = more D.
3. When D increases, there will be a temporary shortage, causing interest rate to increase. This will convince some people to borrow less and others to save (supply) more.

E. Likewise, supply of loanable funds will respond to the interest rate and other factors, including current income and expectations. Also responds to changes in Fed policy which create more reserves.

1. If Fed increase reserves and banks make more loans (which does not always follow), increase supply of loanable funds, causing temporary surplus. What will banks and others do with these surplus savings? Buy interest earning assets such as stocks and bonds. This will decrease the rate of return. Banks will lower interest rates to attract more borrowers.

F. Conclusion

1. If GDP increases then more demand for loanable funds, so higher interest rates, which will reduce some of the growth in GDP (reduce spending by HH and firms).

V. Inflation and interest rates

A. nominal interest rate measures the growth in the amount of dollars invested
B. real interest rate measure the growth in the value of the dollars invested = nominal rate – inflation rate
C. can rewrite this as nominal interest rate = real interest rate + expected inflation, which should be true for new loans
D. money illusion occurs when people do not recognize the effect of inflation on nominal interest rates and think they are earning more or less.
E. this means that we can add expected inflation (pe) to the list of factors that affect the interest rate.