# Bond Pricing Lecture – 9/11

1. Buying a bond = lending to the seller of the bond
2. Bond holders get their money before stock owners
3. Government bonds = very safe
4. Corporate bonds = not totally safe is company goes bankrupt
5. Interest rates and relative risk of the bond determine price.
6. Types
   1. Zero Coupon bonds
      1. Most simple
      2. Pay a price then get it back I guess?
      3. Pricing: Sells below the nominal value / par (value of bond at maturity, usually set to 0) (can sell above par if negative interest rates)
      4. Yield: What rate makes the price match the par value? Pt(T) = PAR / (1+yt(T))^(T-t)
      5. The yield to maturity Yt(T) at time t for a zero coupon bond maturing at time T solves the equation above.
   2. Bond with coupons
      1. Coupons = payments you get every X amount of time
      2. Pay a price, get coupons, when matures get back face value (par) and another coupon
      3. Pricing: Coupon is represented as var C. Semi annual means C/2 is paid twice a year.
      4. Present value / price is determined by discounting back: PAR(1+r)^-T where T = maturity of the bond (time not a value)
      5. Higher the interest rate = lower the bond price.
      6. Yields: Which rate should I use for discounting the cash flows to obtain the quoted price of the bond?
   3. Annuity
      1. At every interval you pay back part of principal + payment
      2. As time comes on, more comes from principle less from interest.
      3. Fixed payment every interval though
      4. Loaned structure for houses, cars, etc.
   4. Serial Loan / Serial Bond
      1. Pay fixed amount of principle every interval
      2. Pay interest that decreases over time.
      3. Pay less every interval over time
      4. These are super uncommon
7. Pricing
   1. Clean price = the price the exchange quotes
   2. Dirty price = price you actually pay – exchange price + accrued interest.
   3. Accrued interest = share of the coupon that the previous owner is entitled to. Coupon amount x the time passed since last coupon date.
   4. On a graph – the jumpy line = dirty price that accounts for accrued interest and smooth line = clean price.

# Bond Yields – 9/18

1. Bond yields
   1. Check the example from the beginnings of the notes today.
   2. Each bond gives a different yield. Similar bonds vary in their yield by maturity.
2. Nelson-Siegel bond model
   1. Four parameters: theta0, theta1, theta2, and theta3
   2. Y(T) = theta0 + (theta1 + theta2/theta3)\*(1-e^-theta3T)/theta3\*T – theta2/theta3 \* (e^-theta3T)
   3. You take actual observations, get the parameters that work best, then can get yields for any maturity.
   4. The book version uses different format
      1. Betas and tau instead of thetas.
      2. Interpret the components that are scaled with Bs as level, slope, and curvature.