Final Exam Information

You are encouraged to check this document to make sure that I did not accidentally have typos in any of the formulas.

Chapter 7

- Cash flows (in and out)
- net present value, $P(i)$, of a set of cash flows
- IRR, internal rate of return, also called the yield rate.
- computation

  by formula
  can be difficult depending on the number of cash flows.

  BA calc
  CF, NPV, and IRR buttons.

  TI-84
  npv(rate, initial,{cash flow},{cash flow freq.})
  irr(initial,{cash flow},{cash flow freq.})

- Yield rate unique
  calculator tend to give the one closest to zero if not unique.
- Reinvesting dividends/mortgage payments/bond payments at a different rate than the original account.

  need to know formulas from the second exam material.
  FV of a set of payments
  FV of a set of increasing payments
  Bond pricing and calculations

  overall yield of the investment(adjusted yield rate).

- Interest measurement of a fund
  A= amount at beginning of the period
  B= amount at the end of the period
  I= amount of interest earned during the period
  C= total net amount of the principal contributed during the period.

  Yield of the fund.

  Actual yield, IRR
  computed with formulas or cash flow worksheet

  Simple interest approximation to IRR
  $$IRR \approx i^{DW} = \frac{I}{A + \sum C_t(1-t)}$$
  approximation to the dollar weighted approximation of the yield. can be used when there are lots of cash flows during the period or when just given overall totals.
  $$i^{DW} \approx \frac{I}{A + \frac{1}{2}C} = \frac{2I}{A + B - I}$$

  Time-weighted rate of interest, i^{TW}
  $$1+i^{TW} = \left(\frac{B_1}{B_0}\right)\left(\frac{B_2}{B_1+C_1}\right)\cdots\left(\frac{B_m}{B_{m-1}+C_{m-1}}\right)$$

- Portfolio Method for investment funds
- Investment Year method for investment funds

Chapter 10

- Yield Curve
- Spot Rates

  Finding PV of a bond/investment

  Computing from zero coupon bonds.

  computing with bootstrap method using coupon bonds

  at-par-yield rate

- Forward Rates
  single year
  multi-year
- relationship between spot rates and forward rates.
- computing forward rates from different investments.

Chapter 11

- $NPV = P(i) = \sum_{t=1}^{n} R_t v^t = \sum_{t=1}^{n} R_t(1+i)^{-t}$

  $$P'(i) = \sum_{t=1}^{n} -tR_t v^{t+1} = \sum_{t=1}^{n} -tR_t(1+i)^{-t-1}$$

  $$P''(i) = \sum_{t=1}^{n} t(t+1)R_t v^{t+2} = \sum_{t=1}^{n} t(t+1)R_t(1+i)^{-t-2}$$

- Duration

  Macaulay duration(Mac d)

  $$\overline{d} = \frac{\sum_{t=1}^{n} t * v^t R_t}{PV}$$

  for equal payments of R

  $$\overline{d} = \frac{R(Ia)_{\overline{n|}}}{Ra_{\overline{n|}}}$$

  $$(Ia)_{\overline{n|}} = \frac{\ddot{a}_{\overline{n|}} - nv^n}{i} = a_{\overline{n|}} + \frac{a_{\overline{n|}} - nv^n}{i}$$

  $$(Ia)_{\overline{\infty|}} = \frac{1}{i} + \frac{1}{i^2}$$

  for a single payment

  $\overline{d}$ =time of the payment

  Modified duration(Mod d)

  $$\overline{v} = \frac{-P'(i)}{P(i)}.$$

  $$\overline{d} = (1+i)\overline{v}$$

- Using a first degree taylor polynomial to approximate the price when there is a small change in the interest rate.

  $$P(i+h) \approx P(i) + P'(i)H = P(i)[1 - \overline{v}h]$$

- Convexity

  $$\overline{c} = \frac{P''(i)}{P(i)}$$

- Using a second degree taylor polynomial to approximate the price when there is a small change in the interest rate.

  $$P(i+h) \approx P(i) + P'(i)h + P''(i)\frac{h^2}{2}$$

  $$= P(i)[1 - \overline{v}h + \overline{c}\frac{h^2}{2}]$$

- $\frac{d}{di}\overline{v} = \overline{v}^2 - \overline{c}$

- multiple securities: P_1,...,P_m

  $$\overline{d} = \frac{\overline{d}_1 P_1 + \overline{d}_2 P_2 + \cdots + \overline{d}_m P_m}{P}$$

  $$\overline{v} = \frac{\overline{v}_1 P_1 + \overline{v}_2 P_2 + \cdots + \overline{v}_m P_m}{P}$$

  $$\overline{c} = \frac{\overline{c}_1 P_1 + \overline{c}_2 P_2 + \cdots + \overline{c}_m P_m}{P}$$

- Analyzing a portfolio with multiple interest rate.

- Absolute Matching/Dedication method to match cash outflows with cash inflows.

- Redding Immunization

- Full Immunization

Any additional topic/information covered in these chapters.