



COMM 298

MIDTERM REVIEW SESSION

by: Josh Lax

Overview

- I. Introduction
- II. Summaries of the 4 lectures
- III. Formula Sheet
- IV. Sample Questions
- V. Q&A
- VI. Feedback Form



Introduction

- **Tutor**
 - Josh Lax
 - 3rd year Finance & Real Estate student
 - Grade in COMM 298 – 96%
- **Review Session**
 - Content:
 1. Course Materials
 2. Sample Questions
 3. Past Exams
 - Timeline:

~3 hours in total

First part: lecture summaries, formulas
5- minute break
Second part: sample questions
5-minute break: challenge question
Third part: sample questions, Q&A, feedback form



Lecture Summaries

Intro to Finance

Why do people borrow? Why do people invest? – lack of capital or lack of projects.

Lender/creditor = person who invests, borrower/debtor = person who borrows

Debt ratings and covenants, seniority, callable debt, convertible debt

Common shares, dual shares, preferred shares, voting rights → Absolute Priority Rule of financing

Primary vs secondary Market → Money market vs capital market

Management *supposed* to maximize equity value, but don't always do so (agency problem)

Financial Management Decisions:

Capital budgeting

What long-term investments or projects should the business take on?

Capital structure

How should we pay for our assets? Should we use debt or equity?

Working capital management

How do we manage the day-to-day finances of the firm?

Financial Intermediaries: Banks, investment banks, brokers, dealers

Financial Institutions: Mutual funds, hedge funds, private equity, venture capital

Time Value of Money

Simple vs. compounded interest

Future versus & Present Value of an investment

“r” as a return, discount rate, cost of capital etc.

Effective Annual Rate, APR [percent, periods]

CANADAS BANK ACT = require short term interest rates to be quoted as APR

CRIMINAL CODE = limits interest rates to 60% per year

Loans (payday, interest-only, pure discount, equal payments, equal principal, amortization table)

Converting from and to EAR, APR, Effective period rates

Annuities, Present and Future Value of them (Annuities Due)

Contract interest rate versus **Personal interest rate**

Bonds

Face/Par Value usually = \$1,000

Coupon rate in terms of APR

Bond prices and market interest rates are inversely related.

Perpetual Bonds = Constant year end payments, never mature

Sensitivity analysis -> (New – old) / old

Bonds with different maturities have different sensitivities to rate changes (interest rate risk)

Calculating Coupon Payments using rate and payout frequency

YTM = the **one** discount rate to price bond, quoted in APR terms

YTM assumes: hold the bond until maturity, reinvest coupons at YTM.

YTM < CR	P > F	a premium
YTM = CR	P = F	par
YTM > CR	P < F	a discount



YTM as “solver” of finding the one “r” to price bond

Current Yield = Annual Coupon / Current Price, good to use if have to trial and error for YTM

Bond prices quoted as a percent of a \$1,000 face value. If price = \$1,045.90, it's quoted as 104.59

Quotes also provide coupon rate, maturity date, and YTM information.

Default (or credit) risk: risk that a bond issuer will be unable to make promised payments of coupons or principal. Investors expect to be compensated through a higher yield. (Risk **averse**)

Default premium: YTM on risky bond - YTM of risk-free bond w/ similar maturity and coupon.

Realized rate of return (ROR): the annual rate of return that an investor actually earned during the time period that they owned an asset. Find HPR, and then find EAR of it to end with ROR

Bond yields affected by: The real rate of interest, Premium for expected future inflation, Interest rate risk premium, Default risk premium, & Liquidity premium

The **term structure** is a plot of yields on risk-free gov.t bonds of different maturities. (yield curve)

Risk-free bond yields represent: The real rate of interest, Premium for expected future inflation, & An interest rate risk premium

Nominal returns: returns in dollar terms, **Real returns:** returns in terms of purchasing power.

- Investors should be concerned about the real investment rate of return, but **Money Illusion** exists

Inflation = % increase in price of goods, Investors **should** care about purchasing power not price

Discounting nominal cash flows by nominal % = discounting real cash flows by real interest rate!

Stocks

Residual cash flows of a firm = **earnings**, board and management decide how much of earnings to distribute to shareholders. Dividends are the portion of earnings paid to shareholders.

Shareholders elect a board of directors (1 share = 1 vote), whose job is to hire management.

Preferred shares pay a fixed periodic dividend (perpetuity), and have priority over common shares.

Common Stock price = present value of all expected future dividends $\rightarrow D1/1+r + D2/(1+r)^2 \dots$

If zero growth in dividends, then just perpetuity. If Dividends grow, $P(0) = [D1 / (r - g)]$

Expected rate of return, r, is a market rate, driven by alternative returns on similar-risk securities and is NOT determined by the expected dividends and growth of the firm.

The price of the stock, P_0 , varies and is related to expected dividends and growth prospects, given the market rate of return, r.

Cum-dividend stock price = ex dividend + not issued yet dividend



Discounting: $PV = FV(1+r)^{-n}$

Compounding: $FV = PV(1+r)^n$

Present Value of an n-payment annuity of \$A = $A \left[\frac{1 - (1+r)^{-n}}{r} \right]$

Future Value of an n-payment annuity of \$A = $A \left[\frac{(1+r)^n - 1}{r} \right]$

Present Value of a perpetuity of \$A = $\frac{A}{r}$

Converting APR to effective annual rate: $r_{\text{annual}} = \left[1 + \frac{i}{m} \right]^m - 1$

Converting APR to effective periodic rate: $r_{\text{periodic}} = \left[1 + \frac{i}{m} \right]^{\frac{m}{k}} - 1$

Effective rate with continuous compounding: $r_{\text{periodic}} = e^{in} - 1$

Bond valuation: $P = I \left[\frac{1 - (1+r)^{-n}}{r} \right] + F(1+r)^{-n}$

Realized Rate of Return: $ROR = \left[\frac{(\text{selling price} + FVRC)}{\text{purchase price}} \right]^{\frac{1}{n}} - 1$

Fisher Equation: $1 + \text{real rate} = \frac{1 + \text{nominal rate}}{1 + \text{inflation rate}}$

Constant Dividend Growth: $P_0 = \frac{DIV_1}{r - g}$ and so $r = \frac{DIV_1}{P_0} + g$



Sample Questions

Question 1.

You take out a \$5,000 loan which calls for **simple interest** of 5% per year. Repayment of principal and all accumulated interest is to be made at the end of year 5.

- a) How much is your payment to settle the loan at the end of year 5?

- b) How much would your payment be if instead the interest was compounded annually?

Question 2.

Joe is going to attend a four-year university 10 years from today. The annual tuition will be \$30,000 paid at the end of each year. Joe's parents want to make one deposit **today** into their savings account which will **exactly** pay for the four years of tuition in Joe's future. Their savings account generates an 8% EAR.

- a) How much do Joe's parents need to have **10 years from now** in their account to pay for Joe's tuition, assuming they withdraw and pay the \$30,000 tuition at the end of each of the 4 years of his degree?

- b) What amount must Joe's parent deposit **today** to achieve that balance in 10 years?

- c) If the savings account only generated a 6% annual return, by what **percent** would the amount Joe's parents need to deposit **today** increase?



Question 3.

Suppose in the future you want to buy a \$1,000,000 house. Your down-payment will be 20%, and you will take on a 30-year equal payment mortgage for the remaining balance at a 4% APR, compounded semi-annually. Today, you deposit \$100,000 in a savings account with a 10% EAR.

- a) How long will it take for you to be able to make the down-payment?

- b) What will be your **monthly** mortgage payment for the following 30 years?

- c) Assuming you pay off the house after the 30 years, and then immediately sell it for \$1,200,000 what will be your Holding Period Return

Question 4.

Today is your birthday! As a gift, your parents have decided to offer you two different financial opportunities. If you choose gift A, your parents will give you a one-time sum of \$100. If you choose gift B, your parents will give you \$8 at the **beginning** of every year, **forever**. Assume that you would place your funds into a high-yield savings account that generates a 7.5% **APR** compounded **quarterly**.

- a) Under these assumptions, which gift would you choose?

- b) What APR (compounded quarterly) would make you indifferent in choosing a gift?



5-Minute Break

Here's a challenge question to work on

Your time travel machine works! You go back to January 1st, 2000, 8 years before the housing market crash. You take out a mortgage on a \$5 million office building downtown. Initially paying 15% down, you agree to a 35-year term, at 10% APR compounded semi-annually. You pay **equal monthly** payments at **the end** of each month.

- a) On January 1st, 2008, a pension fund offers you \$10 million for your office! Assuming you agree and pay off the remaining balance of your mortgage, what will be the **remaining amount** of proceeds from sale?



More Sample Questions

Question 5.

The government of Canada decides to issue zero-coupon bonds with a 5-year maturity with a face value of \$1,000. Currently the YTM is 4%.

- a) How much would it cost to buy this bond today?

Question 6.

The government of Canada again issues bonds with a face value of \$1,000, but this time with a 8% **annual** coupon, one-year maturity, and YTM of 6%.

- a) What is the price of this bond today?

Question 7.

A risk-free bond is issued with \$1,000 face value, 10-year maturity, 4% **annual** coupon, 6% YTM

- a) What is the current price of the bond?

- b) Assume you buy and hold the bond for the full 10 years, and invested the coupons in an account which earned 5% APR compounded **quarterly**. What would be your Realized Rate of Return for the 10-year hold?

- c) What is the bond's price today if the coupons are paid **semi-annually**?



Question 8.

Instead of issuing more equity, Tesla decides to issue a one-year, zero-coupon bonds at \$940. At the same time, the Government of Canada issues a one-year zero-coupon bond at \$960.

- a) What are the YTM of these two bonds?

- b) What is the Default Premium in this case?

Question 9.

ABC announces today that they will issue a fixed annual dividend of \$1.75 forever starting one year from now. The stock now trades at \$10 / share.

- a) What are ABC investors required rate of return?

- b) Assuming the same required rate of return in a), what would the share price today be if the annual dividend grew by 5% each year?

- c) Assuming the dividend grows like in part b), and you buy a share today, how much will you sell it for in 5 years?

Question 10.

You bought XYZ stock on January 1st, 2018 for \$100. On December 31st, 2018, XYZ issued a dividend of \$10 per share. On December 31st, 2019, XYZ issued a dividend of \$12 per share. On January 1st, 2020, XYZ announces that their dividends will now grow by a fixed rate of 3%.

- a) If investors require a 10% rate of return, what is the new share price on Jan 1st, 2020?

- b) Annual inflation = 3%, what was your **Real** annual rate of return? (excluding dividends)



Q&A

Please fill out the survey on the FB page!

