Finance 350
Spring 06

Mid-term Examination

FIN 350A Business Finance

Spring 2006

You have 1 hour and 50 minutes to complete this exam. Before you do anything else, please write your name and student number above. Also write your name at the top of each page from page 4 to page 10.

This is a closed book exam. However, you may have one sheet of US-letter-sized paper for notes. Calculators, financial or scientific are allowed.

This exam consists of two sections, a multiple-choice section (10 questions) and a non-multiple-choice section (5 questions). Section 1 is worth 30 points, and Section 2 is worth 70 points. For Section 1 questions, please write your answers on the answer sheet provided on page 2. For the questions in Section 2, answers that do not show how you arrive at the answer will receive little or no credit.

94/100

Section 1. Multiple-choice questions

(10 questions – 30 points)

30/30

Please write your answers on the answer sheet below.

Q #	1	2	3	4	5
Answer	D ✓	B ✓	B ✓	A ✓	A ✓

Q #	6	7	8	9	10
Answer	B ✓	C ✓	D ✓	A ✓	D ✓

1. Under which of the following conditions will a future value calculated with simple interest exceed a future value calculated with compound interest at the same rate?
   A) The interest rate is very high.
   B) The investment period is very long.
   C) The compounding is annually.
   D) This is not possible with positive interest rates.

2. The salesperson offers, "Buy this new car for $25,000 cash or, with appropriate down payment, pay $500 per month for 48 months at 8% interest." Assuming that the salesperson does not offer a free lunch, calculate the "appropriate" down payment.
   A) $1,000.00
   B) $4,520.64
   C) $5,127.24
   D) $8,000.00

   N = 48
   $i = \frac{8}{12}$
   PMT = 500
   PV = $ 20,480.36
   Diff ~ 4520.64

3. Which of the following will increase the present value of an annuity, other things equal?
   A) Increasing the interest rate.
   B) Decreasing the interest rate.
   C) Decreasing the number of payments.
   D) Decreasing the amount of the payment.

   Need yr 1 PV

4. What is the present value of a four-period annuity of $100 per year that begins two years from today if the discount rate is 9%?
   A) $297.21
   B) $323.86
   C) $356.85
   D) $388.97

   N = 4
   i = 9
   PMT = 100
   PV = $ 323.97

   $\frac{323.97}{1.09^1} = 297.21$

5. A credit card account that charges interest at the rate of 1.25% per month would have an annually compounded effective rate of _____ and an APR of _____.

A) 16.08%; 15.00%
B) 14.55%; 16.08%
C) 12.68%; 15.00%
D) 15.00%; 14.55%

$EAR = 1.0125^{12} - 1 = 16.08\%$
$APR = .0125 \times 12 = 15\%$

6. The coupon rate of a bond equals:

A) its yield to maturity.
B) a percentage of its face value.
C) the maturity value.
D) a percentage of its price.

7. The yield curve depicts the current relationship between:

A) bond yields and default risk.
B) bond maturity and bond ratings.
C) bond yields and maturity.
D) promised yields and default premiums.

yield curve = plots i rates of bond w/diff maturities but = quality

8. Which of the following is correct concerning real interest rates?

A) Real interest rates are constant.
B) Real interest rates must be positive.
C) Real interest rates must be less than nominal interest rates.
D) Real interest rates, if positive, indicate increased purchasing power.

9. How much should you pay for a $1,000 bond with 10% coupon, annual payments, and five years to maturity if the yield to maturity is 12%?

A) $ 927.90
B) $ 981.40
C) $1,000.00
D) $1,075.82

FV = 1,000
N = 5
PMT = 100 (.1 × 1000)
i = 12

PV = 927.90

disc > coup = Discount

10. The overall goal of financial management should be to:

A) decrease the firm's reliance upon debt.
B) increase the firm's sales.
C) increase the firm's outstanding shares of stock.
D) increase the wealth of the firm's shareholders.

Section 2. Non-multiple-choice questions

(5 questions – 70 points)

(13)

1. [13 points]
A local finance company quotes a 13 percent interest rate on one-year loans. So if you borrow $20,000, the interest for the year will be $2,600. Because you must repay a total of $22,600 in one year, the finance company requires you to pay $22,600/12, or $1,883.33, per month over the next 12 months.

   a. What rate would legally have to be quoted?
   b. If your answer in a) differs from 13%, the rate that the finance company quotes, briefly discuss why.
   c. What is the effective annual rate of the loan?

(a) You must legally quote the APR: ✓
PV = 20,000, Pmt = 1,883.33, N = 12, i = 1.93% per mon
∴ APR = 1.93% × 12 months = 23.19% ✓

(b) The APR is much higher than the 13% b/c the $1,883.33 payments are made before the end of the year, so the borrower does not have these payment amounts the entire year, therefore the rate is much higher at 23.19%.

(c) EAR = $1.0193^{12} - 1$ = 25.78% ✓

→ I just watched Godfather I & II, Perfect!

(11)

2. [12 points]
Michael Corleone went to the mattresses and has just won the war against Moe Green. Moe Green is offering him two tributes: a) His casinos in Las Vegas can afford to pay the Corleone family $10 million **in real terms** every year forever starting next year or b) Michael can accept no tribute for 9 years and then, starting 10 years from today, Moe Green will be able to pay the Corleone family a flat tribute of $20 million **in nominal terms** every year forever. The nominal interest rate for Michael is 15% per year and the inflation rate is 3%.

a. Which tribute should he take?
b. How is it possible that a perpetuity, a perpetual stream of cash flows, can have a finite value? That is, explain how it can be that a finite amount today would finance a perpetuity that pays a certain amount each period forever.

(a) Option A: $1 + \text{real} = \frac{1 + \text{Nom}}{1 + \text{infl}} = \frac{1.15}{1.03} - 1 = 11.65\%$ real i ✓

$PPV = \frac{10{,}000{,}000}{.1165} = \$85{,}836{,}909.87$ ✓

vs

option B: $PPV_9 = \frac{20{,}000{,}000}{.15} = \$133{,}333{,}333.30$ ✓

$PPV = \frac{PPV_9}{(1+\text{infl})^9} = \frac{133{,}333{,}333.3}{1.03^9} = \$102{,}188{,}897.60$

$\times 1.15^9$

∴ Option B has a higher PV, so he should take B (−1)

(b) Given an interest rate, a finite amount can be calculated that will yield a perpetual stream of cash flows b/c the finite amount will continue to gain interest forever to finance the endless stream of cash flows. ✓

$1 + \text{real} = \frac{1 + \text{Nom}}{1 + \text{infl}}$

$1.084 = \frac{1 + \text{Nom}}{\left(1 + \frac{.036}{12}\right)^{12}}$ Nom = 12.37%

10

3. [15 points]
You are considering 3 options to save for retirement:

a) Starting when you're 22, invest $100 per month for 43 years.
b) Starting when you're 40, invest $500 per month for 25 years.
c) Gamble that your parents will die when you are about 60 and you will inherit their money.

Both the $100 and $500 are stated in **real terms** as of age 22. You expect to be able to earn 8.4% **real** APR, compounded monthly and the inflation rate is 3.6% APR compounded monthly.

a. How much will options (a) and (b) provide for retirement at age 65, in real terms?
b. How much money will your parents have to leave you in nominal terms at age 60 in order for you to retire at age 65 with as much money as in option (a)?

(a) (a) $N = 43 \times 12$, $PMT = -100$, $i = \frac{8.4}{12}$
$PV = \$13,895.15$ ✗
(b) $N = 25 \times 12$, $PMT = -500$, $i = \frac{8.4}{12}$
$PV = \$62,617.46$ ✗ calculation mistake?

$FV = ^2$. −2

(b) You'd need the $PV_A \times (1 + \text{infl})^N$

so: $13,895.15 \times \left(1 + \frac{.036}{12}\right)^{12 \times 38} = \$54,461.39$ ✗

−3

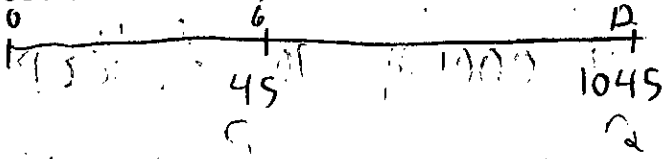
15

4. [15 points]
Consider the following STRIP table:

Maturity	Bid	Ask	% of Par
6 month	96:19	96:20	96.625
1 year	93:20	93:21	93.656
1.5 year	91:02	91.04	
2 year	88:05	88:07	

a. What would be the price of a 9%, $1000 par bond with semi-annual coupons, maturing in one year (the next coupon payment is due in six months)? Use the Ask prices of the STRIPS.
b. What is the yield to maturity of the 9% coupon bond?
c. Is the 9% coupon bond selling at a premium or a discount and why is it doing so?
d. Of the four STRIPS, which should have the most volatile price? EXPLAIN.

(a)



r_1: PV = −966.25, FV = 1000, N = 1, i = 3.49%

$PV\,CF_1 = \frac{45}{1.0349} = \$43.48$ ✓

r_2: PV = −936.56, FV = 1000, N = 1, i = 6.77%

$PV\,CF_2 = \frac{1045}{1.0677} = \$978.74$ ✓

$PV\,CF_1 + PV\,CF_2 = 43.48 + 978.74 = \$1022.22$ ✓

Price

(b) PV = −1022.22, FV = 1000, PMT = 45, N = 2

i = 3.33% per 6 mo.

× 2 ✓

6.66% Yield to Maturity

(c) Since the YTM < coupon rate (6.66% < 9%), the Bond is selling at a Premium, as shown by the $1022.22 price being greater than $1000. ✓

<blank page>

(d) The 2 year to maturity bond will have the most volatile price b/c the interest risk is higher on longer to maturity bonds b/c they're more sensitive to interest rate changes as it compounds over a longer period. ✓

(15)

5. [15 points]
Bond L is a 6 percent coupon bond. Bond K is a 10 percent coupon bond. Both bonds have 10 years to maturity, make semi-annual payments, and have a YTM of 8 percent.

a. If YTM suddenly rise by 2 percent (per year) now, what are the percentage price changes of these bonds?
b. Briefly explain why the two bonds have different sensitivities to interest rate changes.
c. What will the price of Bond L be 6 months from now assuming that YTM stays the same at 8%?
d. Briefly explain why or why not the price of Bond L is expected to change over time.

(a) L: 8% YTM: FV=1000, PMT=30, N=20, i=4, PV=$864.09 ✓
10% YTM: FV=1000, PMT=30, N=20, i=5, PV=$750.76 ✓

Bond L % change = $1 - \frac{750.76}{864.09} = 13.12\%$ drop

K 8% YTM = FV=1000, PMT=50, N=20, i=4, PV=$1,135.90 ✓
10% YTM = FV=1000, PMT=50, N=20, i=5, PV=$1000 ✓

Bond K % change = $1 - \frac{1000}{1,135.9} = 11.96\%$ drop ✓

(b) The bond w/the lower coupon rate (Bond L) is more sensitive to change because cash flows are more sensitive as time goes on b/c they have longer to compound, ✓ & with a lower coupon rate, a greater proportion is on the most sensitive repayment of principal, as opposed to early cash flows, (therefor it's more sensitive to interest rate changes.

(c) N=19, FV=1000, PMT=30, i=4,
$PV_{6\,mo.}$ = $868.66 ✓ = Price in 6 months

(d) The price will continually rise as the bond gets closer to maturity b/c the future cash flows, including the repayment of principal, will have less periods to be

9/10

discounted back to, so the price as time goes on will rise. For instance, as you get closer to maturity, the $1000 repayment will get nearer to the $1000 FV b/c there's less time to discount it to the PV. ✓