

## ASSIGNMENT #2

### Question 1

(a)

N	I/YR	PV	PMT	FV
10 x 2 = 20	= <b>3.5823</b>	-1,200	1,000 x .1 x 1/2 = 50	1,000

∴ YTM = 3.5823% x 2 = 7.1646%      **The yield MUST be expressed on an ANNUAL basis.**

(b)

Since question uses the term “effective yield”, the investor “truly” wants to earn 3.5823% every 6 months.

Thus, effective Quarterly Yield =  $(1.035823)^{1/2} - 1 = 1.7754\%$

N	I/YR	PV	PMT	FV
10 x 4 = 40	1.7754	= <b>1206.26</b>	1,000 x .1 x 1/4 = 25	1,000

(c)

Since the question does NOT say “effective”, the monthly rate = 3.5823% ÷ 6 = 0.5971%

N	I/YR	PV	PMT	FV
10 x 12 = 120	0.5971	= <b>1201.69</b>	1,000 x .1 x 1/12 = 8.33	1,000

### Question 2

Assume the firm will borrow \$100.

1. If the firm borrows \$100 Canadian, in 6 months it will repay \$100(1.04) = **\$104**

6-month interest rate = 8% ÷ 2 = 4%

2. If the firm borrows pesos, it will borrow 1,000 pesos (equivalent to \$100 Canadian).

6-month interest rate =  $(1.15)^{1/2} - 1 = 7.2381\%$

In one year it will owe 1,000 (1.072381) = 1,072.38 pesos.

In six months, the exchange rate is expected to be 10(1.05) = 10.50 pesos per \$Cdn

Therefore, the firm will owe the equivalent of 1,072.38 ÷ 10.50 = **\$102.13**

**The firm must repay less if it borrows in pesos, therefore it should borrow in Mexico. (TEQUILA!!!)**

### ALTERNATE APPROACHES:

- IF 6-month rates are 7.2381% in Mexico, what do 6-month rates have to be in Canada to satisfy interest-rate parity:

$$\frac{10.50}{10} = \frac{(1.072381)}{(1+r_b)}$$

$$r_b = 2.13\%$$

**Thus, in order to be indifferent between borrowing in Columbia or Canada, the Canadian 6-month interest rate would have to be 2.13%. Since the Canadian interest rate (4%) is greater than 2.13% (the indifferent interest rate), it would be disadvantageous to borrow in Canada. Thus, borrow in Mexico. (TEQUILA!!!)**

- IF 6-month rates are 4% in Canada, what do rates have to be in Mexico to satisfy interest-rate parity:

$$\frac{10.50}{10} = \frac{(1+r_a)}{(1.04)}$$

$$r_a = 9.2\%$$

Thus, in order to be indifferent between borrowing in Mexico or Canada, the Mexican 6-month interest rate would have to be 9.2%. Since the Mexican interest rate (7.2381%) is less than 9.2% (the indifferent interest rate), it would be advantageous to borrow in Mexico. (TEQUILA!!!)

- If borrow in Canada, will have to repay \$100(1.04) = \$104 which will equal 104 x 10.50 = **1,092 pesos** at that time.

If borrow in Mexico, will have to repay 1,000(1.072381) = **1,072.38 pesos** at that time.

**Thus, the firm should borrow in Mexico.**

### Question 3

(a)

$$D_1 = D_2 = D_3 = 0$$

$$D_4 = 1$$

$$D_5 = 1 \times 1.2 = 1.2$$

$$D_6 = 1.2 \times 1.2 = 1.44$$

$$D_7 = 1.44 \times 1.2 = 1.728$$

$$P_7 = D_8 \div (.14 - .10) = (1.728 \times 1.1) \div .04 = 1.9008 \div .04 = 47.52$$

Price = PV of  $D_1$  to  $D_6$  and  $(D_7 + P_7)$

0	CF <sub>j</sub>	
0	CF <sub>j</sub>	
3	2ndF N <sub>j</sub>	
1	CF <sub>j</sub>	
1.2	CF <sub>j</sub>	
1.44	CF <sub>j</sub>	
49.248	CF <sub>j</sub>	[1.728 + 47.52]
14	I/YR	
2ndF	NPV	= 21.55

Since the stock is trading at \$20, you should issue a BUY recommendation because you believe its value is \$21.55.

(b)

$$D_1 = D_2 = D_3 = D_4 = D_5 = 0$$

$$D_6 = 1$$

$$D_7 = 1 \times 1.2 = 1.2$$

$$D_8 = 1.2 \times 1.2 = 1.44$$

$$P_8 = D_9 \div (.14 - .10) = (1.44 \times 1.1) \div .04 = 1.584 \div .04 = 39.60$$

Price = PV of  $D_1$  to  $D_7$  and  $(D_8 + P_8)$

0	CF <sub>j</sub>	
0	CF <sub>j</sub>	
5	2ndF N <sub>j</sub>	
1	CF <sub>j</sub>	
1.2	CF <sub>j</sub>	
41.04	CF <sub>j</sub>	[1.44 + 39.60]
14	I/YR	
	2ndF NPV	= 15.32

Since the stock is trading at \$20, you should issue a DON'T BUY recommendation because you believe its value is \$15.32.

#### Question 4

$$\text{EAR (Missing Discount)} = (1 + 2/98)^{365/30} - 1 = (1.020408)^{12.1667} - 1 = \mathbf{27.86\%}$$
 where  $30 = 50 - 20$

$$\text{EAR (Borrowing)} = (1.022)^{12} - 1 = \mathbf{29.84\%}$$

Thus, the firm should NOT borrow- i.e., it should miss the discount.

#### ALTERNATIVE APPROACHES:

1. Calculate effective monthly rate for missing the discount and compare it to 2.2% monthly rate:

$(1.2786)^{1/12} - 1 = 2.07\%$  which is less than the cost of borrowing (2.2%); thus, the firm should NOT borrow- i.e., it should miss the discount.

2. If borrow,  $\text{EAR} = (1.022)^{12} - 1 = 29.8407\%$ .

Thus, 30-day rate =  $(1.298407)^{30/365} - 1 = (1.298407)^{.082192} - 1 = .021695$

If borrow \$98 for 30 days, will have to repay  $98(1.021695) = \$100.13$ .

Thus, it would be better to pay \$100 on day 50 (by missing the discount) than to repay \$100.13 to the bank on day 50.

NOTE: 30 days  $\neq$  1 month.