**PPHA 42510 APPLIED FINANCIAL MANAGEMENT**

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**Practice PV Problems – Due Thursday**

* These problems review TVM calculations and interest rate conversions. The only way to learn this stuff is practice
* GRADING – I will grade you on whether you hand in the problems – not on whether they are right. (Since I am supplying answers to the problems, I assume you can get the right answer.)
* For this problem I am not looking for a fancy or a detailed solution – I just want you to go through the numbers. I want you to hand in your own solution (handwritten is fine), but please feel free to work together if you wish.
* ANSWERS – I am supplying answers for these problems in a separate document. My intention is that you practice and learn from these – it is not a test of your knowledge. **But please work through problems before looking at the answer sheet.**

1. This is the four year 6.5% annual coupon bond we discussed in class on Wednesday. (4 year Eurobond, exact 4 years, with annual coupon 6.5%).
   1. What is the price of the bond if the yield is 6.6%? And draw the CF diagram \_\_\_\_\_\_\_

(this should be easy since this is exactly what was in lecture)

* 1. What is the price of the bond if the yield is 6.7%? \_\_\_\_\_\_\_
  2. How much ($) have you lost going from 6.6% yield to 6.7% yield? \_\_\_\_\_\_\_
  3. Why does the price go up when the yield goes down?

1. Say we are now one year later, so the bond is now a 3 year Eurobond with annual coupon 6.5%
   1. What is the price of the bond if the yield is 6.6%? \_\_\_\_\_\_\_
   2. Why is the price different for a 3 year and a 4 year bond?
   3. What is the yield if the price is 99.0? \_\_\_\_\_\_\_
2. Somebody offers to sell you a 3 year Eurobond with annual coupon of 7.0% at a price of 99.50. Which bond is a better buy, the 6.5% coupon at 99.0 or the 7.0% coupon at 99.5? Answer this as follows:
   1. What is the yield on the 3 year 6.5% coupon bond at $99? (from above): \_\_\_\_\_\_\_
   2. What is the yield on the 3 year 7% coupon bond at $99.5? \_\_\_\_\_\_\_
   3. Would you prefer to invest money at 6.880% or 7.191%? Or to say another way, would you rather have a bank account that pays you 6.880% or 7.191%?
   4. So which bond would you rather buy?
3. What would be your answer if the 6.5% coupon bond is priced at $102 and the 7.0% coupon bond at $103
   1. What is the yield of the 6.5% coupon bond at $102? \_\_\_\_\_\_\_
   2. What is the yield of the 7.0% coupon bond at $103? \_\_\_\_\_\_\_
   3. Which bond would you prefer to buy?
   4. What if the 6.5% coupon bond were offered to you at $101? \_\_\_\_\_\_\_

Now some interest rate conversions. Remember that the basic PV relations are:



and since the cash flows (PV and FV) are the same for each equation, we must have



which means that



1. Fill in the following table of interest rate conversions.

|  |  |
| --- | --- |
| *yab* | *ysab* |
| .08 | .07846 |
| .06 |  |
| .04 |  |
|  | .06 |
|  | .04 |
| .10 |  |

1. Now let’s deal with a bond that has semi-annual coupons. This gets a bit messy because there are two ways to think about it.

Consider a 10-year semi-annual bond (exact half-years so you can use TVM).

* + **10 year maturity**
  + **2.25% semi-annual coupon**
  + **Price $95**
  1. Easiest, keep everything per period
  + 10 years = 20 periods (20 half-years)
  + 2.25% semi-annual coupon = 1.125 payment (per half-year)

With 1 P/YR:

Key Display Description

FIN TVM OTHER Accesses TVM menu

1 P/YR END EXIT 1 … pmts per year

N I%YR PV PMT FV

GIVEN 20 -95 1.125 100

SOLVE FOR

The sab yield is then 2x the “I%YR”: Yield =

* 1. Alternative, set P/YR=2. This keeps N=20 and PMT=1.125, but now the I%YR is the sab rate (already multiplied by 2)

With 2 P/YR:

Key Display Description

FIN TVM OTHER Accesses TVM menu

2 P/YR END EXIT 2 … pmts per year

N I%YR PV PMT FV

GIVEN 20 -95 1.125 100

SOLVE FOR

1. And finally, for a hard problem.

Consider a 10-year **annual** bond.

* + **10 year maturity**
  + **2.25% annual coupon**
  + **Price $95**
  1. What is the ab yield for this bond? \_\_\_\_\_\_\_

Set back to 1 P/YR:

Key Display Description

FIN TVM OTHER Accesses TVM menu

1 P/YR END EXIT 1 … pmts per year

N I%YR PV PMT FV

GIVEN 10 -95 2.25 100

SOLVE FOR

* 1. Convert the sab yield from the 10 year semi-annual bond above to an ab yield so we can compare the two bonds. Which is “cheaper” (higher yield)?

|  |  |  |
| --- | --- | --- |
|  |  |  |
|  |  |  |
|  |  |  |
|  |  |  |