ECO 4368  
Fall 2013  
Homework 2  
Due November 5, 2013

There are 3 questions. Total points is 100.

Question 1 (WACC) (35 points) A company finances its operations with 40 percent debt and 60 percent equity. The company requires $B = 250$ million in total capital. Its net earnings are $I = 150$ million and it has a dividend payout ratio of $x = 20\%$. The interest rate on company's debt is $r_d = 11\%$ and the tax rate is $30\%$. The company's common stock trades at $P_0 = 30$ per share, and its next expected dividend of $D_1 = 2.70$ per share will grow at a constant rate of $g = 5\%$ a year. The flotation cost of external equity, in case it is issued, is 10 percent. What is the company's WACC?

Step 1: We have $w_e B = 0.6 \times 250M = 150M$  
$I(1-x) = 150M \times (1-0.2) = 120M$  

Since $I(1-x) < w_e B \Rightarrow$ external equity.

Step 2: Cost of external equity $r_e^\text{external} = \frac{D_1}{P_0 (1-t)} + g$  

$\Rightarrow r_e^\text{external} = \frac{2.7}{30 \times (1-0.10)} + 0.05$  

$\Rightarrow r_e^\text{external} = 15\%$

Step 3:  

\[ WACC = w_d r_d (1-T) + w_e r_e^\text{external} \]

\[ WACC = 0.4 \times (0.11)(1-0.30) + 0.6 \times (0.15) \Rightarrow WACC = 12.08\% \]
Question 2: (IRR, CAPM and Annuity Flow Project) (30 points) A company uses internally generated equity to finance its capital budget and it uses CAPM to compute its cost of capital. The risk free rate is \( r_{RF} = 5\% \) and market risk premium is \( r_{M} - r_{RF} = 10\% \). Company is considering a 4 year project which requires a date 0 outlay of $60,740 and which generates a flow of $20,000 in each of Year 1, Year 2, Year 3 and Year 4. What is the highest value of beta for which the company will undertake the project?

\[
\begin{align*}
20,000 & \quad 20,000 & \quad 20,000 & \quad 20,000 \\
-60,740 & \quad y1 & \quad y2 & \quad y3 & \quad y4
\end{align*}
\]

Finding IRR

\[
\text{NPV at } IRR = 0
\]

\[
-60,740 + 20,000 \times (PVIFA)_{4, IRR} = 0
\]

\[
(PVIFA)_{4, IRR} = \frac{-60,740}{20,000} = 3.037
\]

\[
\Rightarrow IRR = 12\%.
\]

IRR accepts the project if

\[
IRR > \text{cost of capital}
\]

\[
12\% > 5\% + \beta_s (r_m - r_{RF})
\]

\[
12\% > 5\% + \beta_s (10\%)
\]

\[
\Rightarrow \beta_s < 0.7
\]
Question 3: (Stock Price and MIRR) (35 points) The next expected dividend of company is \( D_1 = 8 \). The dividend growth rate is expected to be constant at 4%. The company's current stock price is \( P_0 = 80 \). Suppose that the company is evaluating a project which costs $190,000 and will generate an income stream of 100,000 in each of the next 2 years. What is the MIRR for this project? Should the company undertake this project according to the MIRR criteria?

**Step 1**  First find cost of capital

\[
\text{cost of capital} = \frac{D_1}{P_0} + g = \frac{8}{80} + 0.04
\]

\[
\Rightarrow \text{cost of capital} = 14\%
\]

**Step 2**

Future Value of Positive Cash Flows

\[
= (100,000)(FVIFA)_{2,14}\%
\]

\[
= (100,000) (2.14)
\]

\[
= 214,000
\]

**Step 3**

\[
(1 + \text{MIRR})^2 = \frac{\text{Future Value}}{\text{Initial Cost}}
\]

\[
\Rightarrow (1 + \text{MIRR})^2 = \frac{214,000}{190,000}
\]

\[
\Rightarrow (1 + \text{MIRR})^2 = 1.1263
\]

\[
\text{MIRR} = 6.12\%
\]

Since \( \text{MIRR} = 6.12\% < \text{cost of capital} = 12\% \)

\[\text{(REJECT)}\]