FIN 521: Problem Set #2

Due on Wednesday, March 7, 2018

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Question 1

Question 2

Since $r_a = \frac{D}{D+E} r_d + \frac{E}{D+E} r_e$, $r_e = r_a + \frac{D}{E}(r_a - r_d)$. Therefore, in this case, $r_e = 0.09 + \frac{0.25}{0.75}(0.09 - 0.06) = 10\%$. Using formula $r_{wacc} = \frac{E}{D+E} r_e + \frac{D}{D+E} r_d(1 - \text{tax rate})$, we can find WACC for a new airline business as follows.

$$r_{wacc} = 0.75 \times 0.1 + 0.25 \times 0.06 \times (1 - 0.4) = 8.4\%$$

Question 3

Since price of a bond is expected payoff discounted by cost of debt, and an yield of a bond is a discount rate for promised payoffs, price and yield of the bond is calculated as follows.

$$Price = \frac{0.8 \times 1 + 0.2 \times 0.5}{(1.06)^5} = 0.60528 \text{ per dollar}$$
$$\frac{1}{(1 + yield)^5} = 0.60528 \Rightarrow yield = 0.10563$$

Question 4

a) Bond issuers voluntarily choose covenants because they can reduce cost of debts if they choose them. They might have to pay less coupon or can issue bond with lower price if they include covenants in their bonds.

b) Because convertible bonds are like an option to investors, price of bonds is higher than bond without conversion feature. In other words, convertible bonds have lower yield because investors can increase their return by exercising conversion feature when stock price is high and doing nothing when stock price is low.

Question 5

a. By dividend discount model, stock price is calculated as $P_0 = \frac{Div_1}{(1+r_e)} + \frac{Div_2}{(1+r_e)^2} + \dots$. Since it is assumed that Summit's dividend grows by 3% per year, estimated price per share is calculated as follows.

$$P_0 = \frac{1.50 \times 1.03}{1.11} + \frac{1.50 \times (1.03)^2}{(1.11)^2} \cdots = \frac{1.5 \times 1.03}{1.11 - 1.03} = 19.31250$$

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b. By using the equation $P_0 = \frac{Div_0 \times g}{r-g}$, the implied discount rate of dividend is calculated as follows.

$$25 = \frac{1.5 \times 1.03}{r_e - 1.03} \Rightarrow r_e = 9.18\%.$$

Question 6

a. Since enterprise value is a present value of free cash flow, we can estimate enterprise value of Heavy Metal using the following equation.

$$EV = \frac{FCF_1}{1 + r_{wacc}} + \frac{FCF_2}{(1 + r_{wacc})^2} + \cdots \frac{FCF_n}{(1 + r_{wacc})^n} + \frac{T_n}{(1 + r_{wacc})^n} \quad T_n : \text{terminal value}$$

Since it is expected that free cash flows are expected to grow at 4% per year after 5 years and r_{wacc} is 14%, enterprise value can be estimated as follows.

$$T_5 = \frac{82 \times 1.04}{1.14} + \frac{82 \times (1.04)^2}{(1.14)^2} + \cdots = \frac{82 \times 1.04}{1.14 - 1.04} = 852.8$$
$$EV = \frac{53}{1.14} + \frac{68}{(1.14)^2} + \frac{78}{(1.14)^3} + \frac{75}{(1.14)^4} + \frac{82}{(1.14)^5} + \frac{852.8}{(1.14)^5} = 681.37$$

b. Since Equity = EV - Net debt, and there is no excess cash, share price of Heavy Metal corporation is calculated as $(681.37 - 300)/40 = 9.53$.

Question 7

a. First, calculate Price / EPS for PepsiCo. It is calculated as 52.66 / 3.20 = 16.46. Then, apply this ratio using Coca-Cola Company's EPS, then price of Coca-Cola Company's share is calculated as $16.46 \times 2.49 = 40.98$.

b. In order to use this method, we need to assume that the effect of earning for price is similar for both companies.