ADAM

DEPARTMENT OF MANAGEMENT
UNIVERSITY OF TORONTO MISSISSAUGA

MGT339H5S LEC0101 - Business Finance II
Summer 2014

Instructor: ADAM KADAR

QUIZ I – July 22, 2014

Duration: 35 minutes

Aid Allowed: Non-programmable calculator

Instructions:

a) Answer all questions and write the answers in the spaces provided below.
b) Please show your work, where applicable.

LAST NAME: _____ FIRST NAME: _____

STUDENT NUMBER: _____

Question	Mark
Q1: [10]	
Q2: [8]	
Q3: [7]	
Total [out of 25]:	

QUESTION 1: [10 Marks]

BFL Enterprises can issue new 20-year bonds at par that pay 5% annual coupons; the firm would incur 2% floatation costs. They estimate that new preferred shares, providing a $2 annual dividend, could be issued at $25 per share; the firm would incur 8% floatation costs. The company has a beta of 1.1, the current risk-free rate is 1%, the expected return on the market index is 10%, and they believe they could issue new common shares with floatation costs of 5%. The firm's tax rate is 20%.

a) Determine the firm's costs of debt, preferred shares, and common equity financing both using internal and external sources under the conditions indicated above. [6 marks]

Debt: $K_D = 5\%$ $\quad K_D^{New} = \frac{5\%}{1-2\%} = 5.1\%$

Prefs: $Div = \$2$, $P_0 = 25$, $f_P = 8\%$ $\quad K_P = 2/25 = 8\%$ $\quad K_P^{New} = \frac{8\%}{1-8\%} = 8.696\%$

C/S: $B_E = 1.1$, $r_S = 1\%$, $r_M = 10\%$, $f_E = 5\%$ $\quad K_E = 1\% + 1.1[9\%] = 10.9\%$ $\quad K_E^{New} = \frac{10.9\%}{1-5\%} = 11.47\%$

b) What weighted average cost of capital (WACC) would the firm use assuming that is has a "target" capital structure consisting of 30% debt, 10% preferred equity, and 60% common equity for a project that requires $3.5 million in total financing assuming that is has $3 million in internal funds available for reinvestment? [2 marks]

since $\frac{3}{0.6} > 3.5$ use $K_E \neq K_E^{New}$

make sure T_C only included either in K_D calc or WACC NOT both.

$$WACC = 0.3(5\%)(0.8) + 0.08696(0.1) + 0.109(0.6)$$

$$WACC = 8.6346\%$$

c) Suppose everything remains the same as specified above, except that the company needs $6 million in total financing. Calculate the firm's marginal cost of capital. [2 marks]

since $\frac{3}{0.6} < 6 \therefore$ K_e^{new}

$WACC = 5.12(0.8)(0.3) + 0.08656(0.1) + 0.1147(0.6)$

$WACC/MCC = 8.976\%$

QUESTION 2: [8 marks]

V_u

Cranberry Co is currently unlevered and has a value of $10 million. The company is considering including debt in its capital structure and would like to know the likely impact on its value and cost of capital. The current cost of capital is 22%. The firm is considering offering $2 million of new debt at an interest rate of 14%. Cranberry Co would use the proceeds of the debt issue to repurchase stock. The firm's tax rate is 34%. $= T_C$

K_u ; $= D$

a) What is the new value of Cranberry Co after issuing the new debt? [2 marks]

$V_L = V_u + T_C D$

$V_L = 10m + 0.34(2)$

$V_L = 10.68m$

b) Recall that the value of a firm is made up of debt plus equity; given your answer from part (a), what is the new value of the firm's equity? [1 mark]

$V_L = D + E = 10.68$

$\therefore E = V_L - D$

$E = 10.68 - 2$

$E = 8.68$

c) Calculate the firm's debt-to-equity (D/E) ratio. [1 mark]

$D/E = 2/8.68 = 0.2304$

d) Calculate the firm's new cost of equity. [2 marks]

$K_E = K_U + D/E\,(K_U - K_D)(1 - T_C)$

$K_E = 0.22 + 0.2304(0.22 - 0.14)(1 - 0.34)$

$K_E = 23.22\%$

e) What is the new weighted average cost of capital (WACC) for Cranberry Co? [2 marks]

$WACC = 0.14(1 - 0.34)(2/10.68) + 0.2322\left(\frac{8.68}{10.68}\right)$

$WACC = 20.60\%$

QUESTION 3: [7 Marks]

Explain how the static trade-off model can be used to find an optimal capital structure. [7 marks]

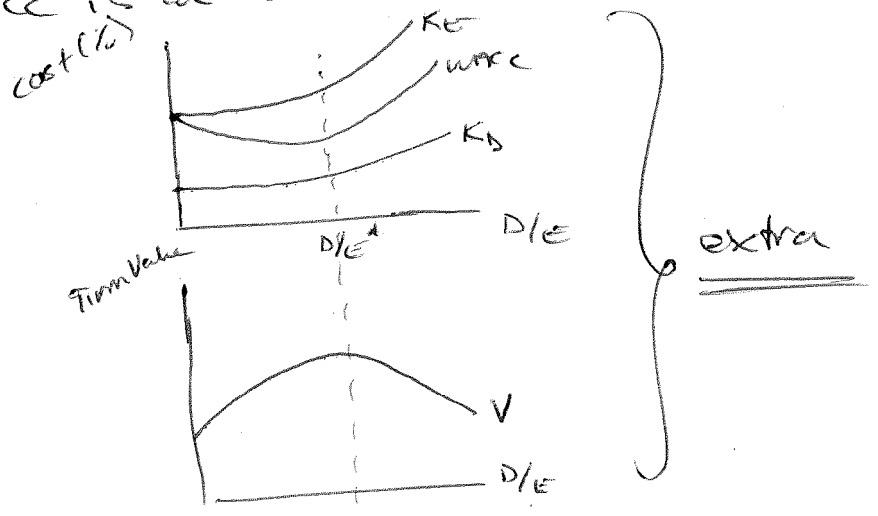
2 The static trade-off model balances the benefit of lower WACC through the use of less costly debt with the increased risk of financial distress and bankruptcy caused by taking on more leverage.

1 Although the cost of equity increases as a firm adds more debt, initially the WACC will decline as long as $K_D < K_E$

2 However, at some point, as more debt is added, the trend in WACC will reverse and it will begin to increase as the financial distress and bankruptcy risk of the incremental charge in debt begins to outweigh any capital cost advantage.

1 The point where the WACC stops decreasing and begins to increase is the optimal capital structure.

1 When WACC is at a minimum, value is maximized.



FORMULA SHEET

Annuities:

$$PV_0 = \frac{PMT}{k}\left[1 - \frac{1}{(1+k)^n}\right]$$

Perpetuity: $PV = \frac{PMT}{k}$

Or, $PV = \frac{PMT}{k-g}$

Bond Valuation: $B = \frac{I}{k_b}\left[1 - \frac{1}{(1+k_b)^n}\right] + \frac{F}{(1+k_b)^n}$

CAPM: $K_i = R_f + \beta_i \times (R_M - R_f)$

Beta(K_i)= $Cov(K_i,R_M)/(\sigma_M)^2$ $\beta_P = \rho_{(Ki,RM)} * (\sigma_{Ki}/\sigma_M)$

For development of the Modigliani-Miller propositions:
We assume perfect capital markets in the following analysis:

- Perfect competition
- Equal access to information
- No transaction costs
- No taxes (later we drop this assumption)

We also assume that the individual can borrow at the same rate as the firm.

MM Prop I – no taxes: $V_L = V_U$
MM Prop I with taxes: $V_L = V_U$ + PV(Interest Tax Shields) = $V_U + DT_c$, if the debt is fixed and permanent.
MM Prop. II - no taxes: $K_E = K_U + (D/E)(K_U - K_D)$
MM Prop. II with taxes: $K_E = K_U + (D/E)(K_U - K_D)(1 - T_C)$

The weighted average cost of capital (assuming debt and common shares):
WACC = K_{wacc} = $\{D/(D+E)\}(1 - T_C) K_D + \{E/(D+E)\}K_E$

Valuation formula: Levered: $V_L = EBIT(1-T_c)/K_{WACC}$
Valuation formula: Unlevered: $V_U = EBIT(1-T_c)/K_U$

Tradeoff theory of capital structure:
$V_L = V_U$ + PV(Interest Tax Shields) - PV(costs of financial distress)

In an MM no tax world, where the beta of debt is 0, $\beta_e = \beta_a(1+D/E)$ where β_e is the beta of leveraged equity and β_a is the asset beta, which is also the beta of the unleveraged equity.

In an MM no tax world, suppose firm L = has 25% debt and 75% equity in its capital structure, and U is an identical firm which is all equity. An investor can earn the same return by either i) buying all of the leveraged firm using his own $$, or ii) buying all of the unleveraged firm but by borrowing 25% of the money and using 75% of his own $$.