Gearing and the Cost of Capital

<u>Basic exercise (1):</u>

1. Complete following table: assume identical companies, except for their leverage.

Company	UNLEVERED	LEVERED
Operating earnings *)	€100	€100
Total market value	€1,000	€……..
Value of equity	€…….	€……..
Value of debt	€0	€400
Cost of debt as a %	8%	8%
Interest expenses	€0	€……..
Cost of equity as a %	………	………
Cost of capital as a %	………	………

*) All depreciation is reinvested; no growth is expected, planning horizon is undetermined.

Answer:
<u>UNLEVERED</u>

1) Value of equity : €1,000
2) Cost of equity : €100 / €1,000 = (*100%) = 10%
3) Cost of capital : 10% (no debt)

<u>LEVERED</u>

1) Total market value : €1,000 (no taxes)
2) Value of equity : €600 (€1,000 -/- €$400)
3) Interest expenses : €32 (8% * 400)
4) Cost of equity : (€68/€600) *100% = 11.33%
5) Cost of debt : (€32/€400) *100% = 8%

WACC = 11.33% * (600/1,000) + 8% * (400/1,000) = 10%.

Advanced exercises (2-3):

2. The value of an unlevered company UNLEVER is €900 million. Its marginal tax rate is 40%.

   Compute the value of equity, of debt and of the whole company if UNLEVER borrows €225 million at 8% annually as a perpetual debt, using this amount to repurchase equity.

Answer:

1) Value company : €900 + (0.40 * 225) = €990
2) Value equity : €990 -/- €225 = €765
3) Value debt : €225

NPV of tax gain goes to shareholders not to debt holders.

3. Apply the Modigliani-Miller theorem to the following data:

   Consider two companies (1) Apple and (2) Bees. The two companies only differ in respect to their leverage. Apple is an all-equity financed company, and Bees has financed its activities with equity as well as debt, with debt financing amounting to €40 million. Both companies realise an EBIT of €20 million per year forever (or in perpetuity). The cost of capital of Apple is 10% annually, the tax rate is 40%, and cost of debt financing is 6%.

   a) Compute the total market value of company Apple.

      1) in a world *without* taxes.

Answer:
€20 / 0.10 = <u>€200</u> *without* taxes.

      2) in a world *with* taxes.

Answer:
€20 x (1-0.40) = €12 / 0.10 = <u>€120</u> *with* taxes.

b) Compute the total market value of company Bees.

1) in a world *without* taxes.

Answer:
1. €20 – (0.06 * €40) = €17.6 / 0.11 [1ft] = €160 equity value.
2. €40 debt value.
3. €160 equity value + €40 debt value = <u>€200</u> company value.

[1ft] = €20 – (0.06 x €40) / €160 = 11%.

2) in a world *with* taxes.

Answer:
€200 company value + (0.4 * 40) = <u>€216</u> company value.

1. €40 debt value.
2. €176 equity value ({€20 – (0.06 * €40) * (1-0.40)}/0.06 [2ft])
3. €40 debt value + €176 equity value = <u>€216</u> company value.

[2ft] = ({€20 – (0.06 * €40) x (1-0.40)}/ €176) *100% = 6.0%

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