

a). $V = \frac{\$800,000}{.2} = \$4,000,000$ Equity is worth the same (all equity)

Price of share = $\frac{\$4,000,000}{100,000} = \40

b). NPV of expansion: $-750 + \frac{250}{.2} = 500$ (thousand).

Thus, at the announcement, $V = 4,500,000$, Price of stock = \$45.

To obtain \$750,000, $\frac{\$750,000}{\$45} = 16,667$ shares sold.

$V = \$4,500,000 + 750,000 = \$5,250,000$ since the 750k is used to purchase new assets

$P = \frac{\$5,250,000}{116,667} = \45 (same as before the issue)

c). Value of the firm increased to \$4,500,000 as before. At issuing of debt,

$V_{\text{firm}} = \$5,250,000$, but $V_{\text{equity}} = \$4,500,000$.

$P_{\text{stock}} = \frac{\$4,500,000}{109,000} = \$45$

d). Expected yearly income:

$\$800,000 + \$250,000 - \overbrace{10\% \cdot \$750,000}^{\text{Interest}} = \$975,000$

expected return is $\frac{\$975,000}{\$4,500,000} = 21.67\%$

e). MM $r_s = r_o + \frac{B}{S}(r_o - r_B)$

$r_s = .20 + \frac{\$750,000}{\$4,500,000}(.2 - .1) = 21.67\%$ (same as d).

2. a). $V_E = \frac{200,000(1-T_c)}{r_o} = \frac{200,000 \cdot .65}{.22} = \$590,909.09$

b). $V_L = V_u + T_c B = 590,909.09 + (.35)(300,000) = \$659,909.09$

3). Using Put-call parity,

$P_{put} = P_{call} + PV(\$60) - P_{stock} = \$5.45 + \frac{60}{(1+\frac{.126}{12})^7} - 55 = \6.21

4). a). if stock is \$25, \$0
if stock is \$40, \$5.100 = \$500

b).

	\$25	\$40
call	0	\$500
$\frac{1}{3}$ stock $\cdot 100$	\$833.33	1,333.33
Borrowing	-\$833.33	-833.33
	0	\$500

$\Delta = \frac{5-0}{40-25} = \frac{1}{3}$ share per "option"

so $33\frac{1}{3}$ total shares

stock + borrowing gives

$\frac{1}{3} \cdot 100 \cdot (30) - \frac{833.33}{1.12} = 1000 - 744.04 = \boxed{\$255.96}$

c). $\Delta = \frac{20-5}{40-25} = 1$ share per option

	\$25	\$40
call	8500	9000
100 stock	2500	4000
Borrowing	-2000	-2000
	500	2000

call is worth

$100 \cdot 30 - \frac{2000}{1.12} = 3000 - 1785.71$

$= \boxed{\$1214.29}$

d). $\Delta = \frac{10-0}{40-25} = \frac{2}{3}$. so we need to buy $66\frac{2}{3}$ shares

	\$25	\$40
call	0	1,000

$\frac{2}{3}$ Stock 1,667 3,667

Borrowing -1,667 -1,667

$$\frac{2}{3} \cdot 100 \cdot P_S - \frac{1667}{1.12} = \overbrace{71000}^{P_{call}}$$

$$\Rightarrow 66.67 \cdot P_S = 1000 + 1488.10$$

$$\Rightarrow P_S = \frac{2488.10}{66.67} = \$37.32/\text{share.}$$