4:00 A | Fall 2013: Final A for 4:00 class

- ½ points earned for extra, wrong answers

ST | +15 1. interest rate

+15 2. none

+15 3. none

+15 4. depreciation

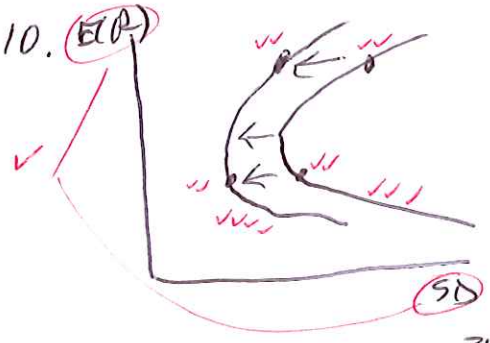
+12/+3 5. fall early and rise later

+5/+5/+5 6. correlation, standard deviation of each asset, weight on high-risk asset

+5/+5/+5 7. beta of equity, market value of equity, beta of debt

+15 8. strike price

9. $\beta_B = (1 - .87286)\left(\frac{800}{300}\right)(.6)$ (+3 on each factor) +3

10. 

11. $500 = 140 + \frac{400}{(1.03)^5}$ (400 → 345.04)

500 ≠ 485.04

500: short; 485.04: Buy

Trans	CF_0
Short Sysco Stock +5	+500 +5
Buy Cisco Stock +5	−140 +5
Buy Cisco bond +5	−345.04 +5
Total	+14.96 +5

CF_1

300	600
−300 +5	−600 +5
∅ +5	+200 +5
+300 +5	+400 +5
∅ +5	∅ +5

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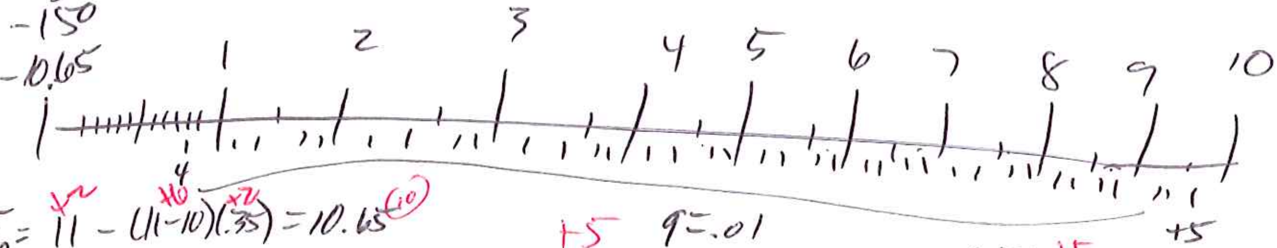
B 2.



$CF_0 = 11 - (11-10)(.35) = 10.65$ (10)

+5 $\quad q = .01$

$N = 9 \times 4 = 36$ +5 (11)

$$NPV = -5 - 150 - 10.65 + \left(\frac{4}{r(\tfrac{1}{4}) - .01}\right)\left(1 - \left(\frac{1.01}{1+r(\tfrac{1}{4})}\right)^{36}\right)\left(\frac{1}{1+r}\right)^{\frac{7}{12}}$$

(15)

$$+5\left(\frac{1}{1+r}\right)^{9\frac{7}{12}}$$ (13)

+5

$.0279 + .9(.06)$ (11)

+5 ($r = r(1) = 2.79 + .9(k)$

-5 : f subtract MM strategy of 1 million

$r(\tfrac{1}{4}) = (1 + r(\tfrac{1}{4}))^{4} - 1$ (11)

+5 ($r(\tfrac{1}{4}) = (1 + r(1))^{\frac{1}{4}} - 1$

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3. +4 ($d_1 = \dfrac{\ln\left(\frac{S}{PV(K)}\right)}{.58\sqrt{3}} + \dfrac{.58\sqrt{3}}{2}$ (13)

+3

$$S = \left(\frac{15}{r(1)}\right)\left(1 - \left(\frac{1}{1+r(1)}\right)^{5}\right)\left(\frac{1}{1+r}\right)^{3}$$ +4 (18)

+3 ($r = .0279 + 1.1(.06)$ (13)

($PV(K) = \dfrac{75}{(1.0065)^{3}}$) +3 (17)

(9)

+4 ($d_2 = d_1 - .58\sqrt{3}$ (4)

+4 ($C = S\,N(d_1) - PV(K)\,N(d_2)$

$N() \Rightarrow$ look up table or XL

+1

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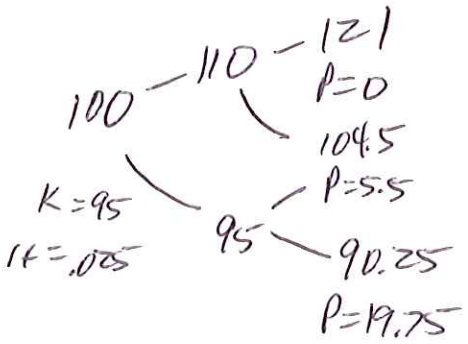
4.



$\Delta_U = \frac{0-5.5}{121-104.5} = -0.3333$ +6

$-\frac{1}{2}$ for each error

$B_U = \frac{5.5-(-.3333)(104.5)}{1.025} = 39.3496$ +6

$P_U = 110(-.3333)+39.3496 = 2.6829$ +6 (12)

$\Delta_d = \frac{5.5-19.75}{104.5-90.25} = -1$ +6

$B_d = \frac{19.75-(-1)(90.25)}{1.025} = 107.3171$ +6

$P_d = 95(-1)+107.3171 = 12.3171$ +6 (12)

$\Delta = \frac{2.6829-12.3171}{110-95} = -0.64228$ +6

$B = \frac{12.3171-(-.64228)(95)}{1.025} = 71.5451$ +6

$P = 100(-.64228)+71.5451 = 7.3171$

+4 +5 +6

Buy to cover .308947 shares = .64228 − .3333

+6 +6

sell bonds worth 33.9847 = .308947 × 110

$= 39.3496 - 71.5451(1.025)$

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PJ 5. a. 250 - 400: $T^* = 1 - \frac{(1-(.55)(.35))(1-.18)}{(1-.27)} = +0.09295$ (30)

400 - 650: $T^* = 1 - \frac{(1-(.15)(.35))(1-.18)}{(1-.27)} = -0.06132$ (30)

Optimal interest = 400

b. lower

c. $SD_p = \sqrt{\left(\frac{100}{400}\right)^2 SD_T^2 + \left(\frac{500}{400}\right)^2 SD_B^2 + 2\left(\frac{100}{400}\right)\left(\frac{500}{400}\right) COV_{T,B}}$ (13)

$SD_T^2 = \frac{1}{3}((84-B)^2 + (2-B)^2 + (9-B)^2 + (18-B)^2)$ (9)

$SD_B^2 = \frac{1}{3}((54-T)^2 + (20-T)^2 + (14-T)^2 + (20-T)^2)$ (9)

$B = \frac{1}{4}(84 + 2 + 9 + 18)$

$T = \frac{1}{4}(54 + 20 + 14 + 20)$

$COV = \frac{1}{3}((84-B)(54-T) + (2-B)(20-T) + (9-B)(14-T) + (18-B)(20-T))$ (18)

$E(R_p) = \left(\frac{100}{400}\right)T + \left(\frac{500}{400}\right)B$ (8)