Chapter 11 HW 2012

Sunday, November 25, 2012
8:29 PM

(15)

(a) Use the CF functionality of your BA II Plus calculator

CF0 = -200
C01 = 40
C02 = 100
C03 = 100
C04 = 60

IRR CPT ⇒ 17.4%

(b) Use BA II PLUS with info from (a)

NPV
I = 12 ↓ CPT ⇒ 24.74

OR

110 100

OR

$$NPV = -200 + \frac{40}{1.12} + \frac{100}{(1.12)^2} +$$

$$\frac{100}{(1.12)^3} + \frac{60}{(1.12)^4} = 24.74$$

(c) Since Σ of profits is negative of the 2 years, it must be greater than 2 years.

Test 3 years

NPV over 3 years at 8%

$$-200 + \frac{40}{1.08} + \frac{100}{(1.08)^2} + \frac{100}{(1.08)^3}$$

$$= 2.15$$

Since this is positive, the discounted pay back period is 3 years.

(d) $$PM = \frac{PV \text{ of Profits}}{PV \text{ of Premiums}}$$

PV of Profits at 12% = 24.74 from part b.

From part b.

PV of Prem $= 400 + \frac{350}{1.12} +$

$$\frac{300}{(1.12)^2} + \frac{250}{(1.12)^3} = 1129.60$$

$$PM = \frac{24.74}{1129.60} = 2.19\%$$

(162)

To calculate the EPV of Future Profits, we need the profit signature

Time	Profit Vector	In Force	Profit Sign
0	-200	1	-200
1	40	1	40
2	100	.97	97
3	100	(.97)(.96)	93.12
4	60	(.97)(.96)(.95)	53.0784

$q_x = 0.03 \Rightarrow p_x = 0.97$

$q_{x+1} = 0.04 \Rightarrow {}_2p_x = (0.97)(0.96)$

$q_{x+2} = 0.05 \Rightarrow {}_3p_x = (0.97)(0.96)(0.95)$

$$EPV = -200 + \frac{40}{1.1} + \frac{97}{(1.1)^2} +$$

$\cdots \cdot 1.1 \cdot (1.1)^2 \cdot$

$$\frac{93.12}{(1.1)^3} + \frac{53.0784}{(1.1)^4} = 22.74$$

(153)

	(1) Prem	(2) Benefits	(3) Expense
0			230
1	300	32,000 (.00592) = 189.44	
2	300	32,000 (.00642) = 205.44	35
3	300	32,000 (.00697) = 223.04	35
4	300	32,000 (.00758) = 242.56	35
5	300	32,000 (.00824) = 263.68	35

	[(1)-(3)][.07] (4) Interest	(1)-(2)-(3)+(4) Profit Vector
0		-230
1	(70)(.07) = 4.90	115.46
2	(265)(.07) = 18.55	78.11
3	18.55	60.51
4	18.55	40.99
5	18.55	19.87

(154)

PREM $\Rightarrow$ 300

BENEFITS $\Rightarrow (10{,}000)(0.02132) = 213.20$

EXPENSE $\Rightarrow 100 + (0.1)(300) = 130$

This is at time 0 so we only need it to get interest

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$$\text{INTEREST} = (300 - 180)(0.06) = 10.20$$

PROFIT = PREM + INT − BENEFITS

− INC IN RESERVE

$$43.84 = 300 + 10.20 - 213.20$$

$$-({}_1V\,p_x - {}_0V) \quad \text{but } {}_0V = 0$$

$$\text{So } {}_1V = \frac{300 + 10.20 - 213.20 - 43.84}{p_x}$$

$$= \frac{53.16}{1 - 0.02132} = 54.32$$

(155)

PREM = 3000
EXP = 258
$_qV$ = 10600

BENEFITS = $(X)(0.03037)$

INCREASE IN RES = ${}_0V\,p_{69} - {}_qV$

$= (11,500)(1 - 0.03037) - 10,000$

$= 1150.745$

T.D. EFFECT = $(.11 + P - F)V_{\text{DT}}$

$$\text{INTEREST} = (9V + P_{10} - E_{10})(0.05)$$

$$= (10{,}000 + 3000 - 258)(0.05) = 637.10$$

$$\text{PROFIT} = 200 = 3000 - 258 + 637.10 - 1150.745 - (X)(0.03037)$$

$$X = \frac{3000 - 258 + 637.10 - 1150.745 - 200}{0.03037}$$

$$= 66{,}788.11$$

(156)

$$\text{BENEFIT PREMIUM} = \frac{100{,}000\, A_{50}}{\ddot{a}_{50}}$$

$$= \frac{100{,}000(.24905)}{13.2668} = 1877.24244$$

$$\text{GROSS PREM} = (1.2)(1877.24244) =$$

$$2252.69$$

$$\text{EXPENSES} = 40 + (0.05)(2252.69)$$

$= 152.63$

$\text{BENEFITS} = (100{,}000)(0.70)(q_{60})$

$= (70{,}000)(0.01376) = 963.20$

$_{10}V = 100000A_{60} - 1877.24244\,\ddot{a}_{60}$

$= 36913 - (1877.24244)(11.1454)$

$= 15{,}990.38$

$_{11}V = 100{,}000\,A_{61} - (1877.24244)\ddot{a}_{61}$

$= 38{,}279 - (1877.24244)(10.8041)$

$= 17{,}809.36$

$\text{INTEREST} = (15{,}990.38 + 2252.69 - 152.63)(0.07) = 1266.33$

$\text{PROFIT} = 2252.69 + 1266.33 - 152.63 - 963.20 - [(17{,}809.36)(1-(0.01376)(.7)) - 15{,}990.38]$

$= 755.75$