(goodwill - practice 01) a-Question

Reading: Odomirok - Chapter 22/23
Model: 2016.Fall #18
Problem Type: GAAP goodwill using cost-of-capital approach

Given

Amounts at time of acquisition at CY	
FV(assets)	690
U.S. GAAP assets	640
FV(liabilities) *other than loss & LAE*	180
purchase price	108

nominal future cash flows of liabilities		
CY	*paid during year*	230
CY + 1	*paid during year*	140
CY + 2	*paid during year*	30
> CY + 2	*paid during year*	0

some more junk you'll need	
pre-tax cost-of-capital	9%
risk-free rate	3%
illiquidity premium	1%

still more junk you'll need:

loss & LAE payments are made mid-year <== use 0.5, 1.5, 2.5,... to discount
return on capital is paid to investores at year-end <== use 1, 2, 3,... to discount

required capital @ year-end = **unpaid x** 50%

(stated slightly differently from exam problem - this is done so that my solution fits the risk-adjustment formula from Odomirok)

Find value of purchaser's GAAP **goodwill** using the cost-of-capital approach

The first section of the solution calculates FV(loss & LAE) according to the 3 components.

Component #1: calculate nominal future cash flows of liabilities

For this problem, we are given the cash flows, otherwise we'd have to calculate them from the LDFs or the payment pattern.

Component #2: discount the nominal cash flows & add a load for illiquidity

discount rate	=	risk-free rate	+	illiquidity premium
	=	3%	+	1%
	=	4%		

Actually, all we did here was calculate the discount rate, i. The actual discounting is done in "component #3" using the risk adjustment formula.

Component #3: First, we need the cumulative unpaid values at the start of each year:

CY	400
CY + 1	170
CY + 2	30
> CY + 2	0

Then the capital required to support these liabilities = 50% x unpaid:

C_0	=	50%	x	400	=	200
C_1	=	50%	x	170	=	85
C_2	=	50%	x	30	=	15
C_3	=	50%	x	0	=	0

Now we can apply the **risk adjustment** formula using the discount rate from above:
Note that we use integer exponents because investors are paid at year-end.

avg(C_0, C_1)	/	(1.04) ^ 1	=	137.0	
avg(C_1, C_2)	/	(1.04) ^ 2	=	46.2	
avg(C_2, C_3)	/	(1.04) ^ 3	=	6.7	
avg(C_3, C_4)	/	(1.04) ^ 4	=	0.0	
				189.9	
			x	5%	= (R - i)
		unpaid component of FV(liabilities) ==>		9.5	

solution continued on next page…

Now we have to calculate the discounted **paid values** using the same discount rate (goodwill - practice 01) b-Answer2

Note that we use fractional exponents 0.5, 1.5, 2.5,… because payments are made mid-year .

230	/	(1.04) ^ 0.5	=	225.5
140	/	(1.04) ^ 1.5	=	132.0
30	/	(1.04) ^ 2.5	=	27.2
				384.7

Now we have all the pieces of FV(liabilities)

unpaid loss & LAE:	9.5	
paid loss & LAE:	384.7	
other than loss & LAE:	180.0	*<== given in the statement of the problem*
FV(liabilities) =	**574.2**	

We also know: **FV(assets) =** **690.0** *<== given in the statement of the problem*

P = **108.0** *<== given in the statement of the problem (purchase price)*

Then:

goodwill	=	P	-	[	FV(assets)	-	FV(liabs)	]
	=	108.0	-	[	690.0	-	574.2	]
	=	-7.8	*<== final answer*					

Reading: Odomirok - Chapter 22/23 (goodwill - practice 02) a-Question
Model: 2016.Fall #18
Problem Type: GAAP goodwill using cost-of-capital approach

Given

Amounts at time of acquisition at CY	
FV(assets)	610
U.S. GAAP assets	610
FV(liabilities) *other than loss & LAE*	150
purchase price	69

nominal future cash flows of liabilities		
CY	*paid during year*	220
CY + 1	*paid during year*	140
CY + 2	*paid during year*	30
> CY + 2	*paid during year*	0

some more junk you'll need	
pre-tax cost-of-capital	8%
risk-free rate	2%
illiquidity premium	2%

still more junk you'll need:

loss & LAE payments are made mid-year <== use 0.5, 1.5, 2.5,... to discount
return on capital is paid to investores at year-end <== use 1, 2, 3,... to discount

required capital @ year-end = **unpaid x** 50%

(stated slightly differently from exam problem - this is done so that my solution fits the risk-adjustment formula from Odomirok)

Find value of purchaser's GAAP **goodwill** using the cost-of-capital approach

The first section of the solution calculates FV(loss & LAE) according to the 3 components.

Component #1: calculate nominal future cash flows of liabilities

For this problem, we are given the cash flows, otherwise we'd have to calculate them from the LDFs or the payment pattern.

Component #2: discount the nominal cash flows & add a load for illiquidity

discount rate	=	risk-free rate	+	illiquidity premium
	=	2%	+	2%
	=	4%		

Actually, all we did here was calculate the discount rate, i. The actual discounting is done in "component #3" using the risk adjustment formula.

Component #3: First, we need the cumulative unpaid values at the start of each year:

CY	390
CY + 1	170
CY + 2	30
> CY + 2	0

Then the capital required to support these liabilities = 50% x unpaid:

C_0	=	50%	x	390	=	195
C_1	=	50%	x	170	=	85
C_2	=	50%	x	30	=	15
C_3	=	50%	x	0	=	0

Now we can apply the **risk adjustment** formula using the discount rate from above:
Note that we use integer exponents because investors are paid at year-end.

avg(C_0, C_1)	/	(1.04) ^ 1	=	134.6	
avg(C_1, C_2)	/	(1.04) ^ 2	=	46.2	
avg(C_2, C_3)	/	(1.04) ^ 3	=	6.7	
avg(C_3, C_4)	/	(1.04) ^ 4	=	0.0	
				187.5	
			x	4%	= (R - i)
		unpaid component of FV(liabilities) ==>		7.5	

solution continued on next page…

Now we have to calculate the discounted **paid values** using the same discount rate (goodwill - practice 02) b-Answer2

Note that we use fractional exponents 0.5, 1.5, 2.5,… because payments are made mid-year .

220	/	(1.04) ^ 0.5	=	215.7
140	/	(1.04) ^ 1.5	=	132.0
30	/	(1.04) ^ 2.5	=	27.2
				374.9

Now we have all the pieces of FV(liabilities)

unpaid loss & LAE:	7.5	
paid loss & LAE:	374.9	
other than loss & LAE:	150.0	*<== given in the statement of the problem*
FV(liabilities) =	**532.4**	

We also know: **FV(assets) =** **610.0** *<== given in the statement of the problem*

P = **69.0** *<== given in the statement of the problem (purchase price)*

Then:

goodwill	=	P	-	[	FV(assets)	-	FV(liabs)	]
	=	69.0	-	[	610.0	-	532.4	]
	=	-8.6	*<== final answer*					