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

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 further down after the risk margin calculation.

Component #3:   risk margin calculation

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

First, we need the cumulative unpaid values
at the start of each year. See table at right =>

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)
		risk margin component of FV(liabilities) ==>		9.5

solution continued on next page…

Now we have to calculate the discounted **unpaid values** using the same discount rate
Use the given **incremental** unpaid values.
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)

risk margin	9.5	
unpaid 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*
Then:			*(purchase price)*

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)	500
U.S. GAAP assets	520
FV(liabilities) *other than loss & LAE*	130
purchase price	70

nominal future cash flows of liabilities	
CY *paid during year*	180
CY + 1 *paid during year*	100
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	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

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%	+	1%
	=	<u>3%</u>		

*Actually, all we did here was calculate the discount rate, i. The actual discounting
is done further down after the risk margin calculation.*

Component #3:   risk margin calculation

CY	310
CY + 1	130
CY + 2	30
> CY + 2	0

First, we need the cumulative unpaid values
at the start of each year. See table at right =>

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

C_0	=	50%	x	310	=	155
C_1	=	50%	x	130	=	65
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 <u>integer</u> exponents because <u>investors are paid at year-end</u>.

avg(C_0, C_1)	/	(1.03) ^ 1	=	106.8
avg(C_1, C_2)	/	(1.03) ^ 2	=	37.7
avg(C_2, C_3)	/	(1.03) ^ 3	=	6.9
avg(C_3, C_4)	/	(1.03) ^ 4	=	0.0
				151.4
			x	5% = (R - i)
risk margin component of FV(liabilities) ==>				7.6

solution continued on next page…

Now we have to calculate the discounted **unpaid values** using the same discount rate
Use the given **incremental** unpaid values.
Note that we use <u>fractional</u> exponents 0.5, 1.5, 2.5,… because <u>payments are made mid-year</u> .

180	/	(1.03) ^ 0.5	=	177.4
100	/	(1.03) ^ 1.5	=	95.7
30	/	(1.03) ^ 2.5	=	27.9
				300.9

Now we have all the pieces of FV(liabilities)

risk margin	7.6	
unpaid loss & LAE:	300.9	
other than loss & LAE:	130.0	*<== given in the statement of the problem*
FV(liabilities) =	**438.5**	

We also know: **FV(assets) =**   **500.0** *<== given in the statement of the problem*
                              P =   **70.0** *<== given in the statement of the problem*
Then: *(purchase price)*

goodwill	=	P	-	[	FV(assets)	-	FV(liabs)	]
	=	70.0	-	[	500.0	-	438.5	]
	=	8.5	*<== final answer*					