

**Paper:** Odo.FinReg  
**Problem:** 2015.Fall #11  
**Problem Type:** Calculate PV(commuted claims), **WITH** risk margin

**Notation:** TMF = Total Margin Factor

**Concept:**  $TMF = (\text{req'd margin}) \times (\text{target cap to req'd ratio}) \times (\text{risk cost of capital})$

**Given:** All information is as at yr-end: 2014

undiscounted liabilities to be commuted:	2,000,000
risk-free rate:	1.0%
required margin:	10%
target capital to required ratio:	250%
risk cost of capital:	8%

calendar yr pmt patterns:

2015	10%
2016	30%
2017	75%
2018	100%

**Assume:** All pmts are made in the middle of the year

PV(with margin) = 2,065,537

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PV(w/o margin):

*that's why the exponents for the margin are integers*

margin:

	(1)	2,000,000 x (1) = (2)	# yrs to discount (3)	discount @ 1% (4)
2015	10%	200,000	0.5	199,007
2016	20%	400,000	1.5	394,074
2017	45%	900,000	2.5	877,888
2018	25%	500,000	3.5	482,887
				1,953,856

TMF = 2.00%

pmt rem @ beg yr (5)	TMF x (5) = (6)	# yrs to discount (7)	discount @ 1% (8)
2,000,000	40,000	1	39,604
1,800,000	36,000	2	35,291
1,400,000	28,000	3	27,177
500,000	10,000	4	9,610
			111,681

**Note 1:** The (# of yrs to discount) is DIFFERENT for calc'ing the PV(w/o margin) and the corresponding margin. Refer to columns (3) and (7).

**Note 2:** Think of (6) as the "cost of capital". The intermediate steps are:  
 req'd margin = (5) x req'd margin  
 target capital = (5) x req'd margin x (target capital to req'd RATIO)  
 cost of capital = (5) x req'd margin x (target capital to req'd RATIO) x risk cost of capital