

Reading: Feldblum.Surplus
Model: 2018.Spring #12
Problem Type: invested capital & PV(future income)

(invested capital - 2018.Spring Q12) a-Question

Given From a company's CY annual statement:

statutory surplus	S	200
deferred tax assets	DTA	25
unearned premium reserve	UEP	150
undiscounted loss reserve	R	400

Other junk you need to solve the problem:

written premium (annual)	WP	300
pre-tax income (annual)	PTI	50
cost of liquidation	CoL	30
cost of capital	% CoC	12%
tax rate	% tax	35%
pre-paid acquisition cost	% acq	25%
discount factor for loss reserves	% disc	80%

- Find**
- (a) invested capital for given CY
 - (b) present value or PV(future income)
 - (c) would the shareholders prefer liquidation or continued operation of the company

(a) $\text{invested capital} = S + (\% \text{ acq} \times \text{UEP}) + (1 - \% \text{ disc}) \times R - \text{DTA}$

$$\begin{aligned}
 \text{invested capital} &= S \\
 &+ (\% \text{ acq} \times \text{UEP}) \\
 &+ (1 - \% \text{ disc}) \times R \\
 &- \text{DTA} \\
 &= 200 \\
 &+ (25\% \times 150) \\
 &+ (1 - 80\%) \times 400 \\
 &- 25
 \end{aligned}$$

invested capital = **292.50** <== answer to part (a)

(b) $\text{PV}(\text{future income}) = (\text{pre-tax income}) \times (1 - \% \text{ tax}) / (\% \text{ CoC})$

$$\begin{aligned}
 \text{Pv(future income)} &= \text{PTI} \times (1 - \% \text{ tax}) / \% \text{ CoC} \\
 &= 50 \times (1 - 35\%) / 12\% \\
 \text{Pv(future income)} &= \mathbf{270.8} <== \text{answer to part (b)}
 \end{aligned}$$

(c) **Decision Table:** (InvCap = invested capital, CoL = Cost of Liquidation)

InvCap - CoL	>	PV(future income)	==>	liquidate
InvCap - CoL	<	PV(future income)	==>	continue operations
InvCap - CoL	=	PV(future income)	==>	doesn't matter <i>(maybe look at income trends?)</i>

For this problem we have:

InvCap - CoL = **262.50**

This leads to the final answer below:

invested cap. - CoL < **PV(future income)** ==> **continue operations** <== answer to part (c)

Bonus Question

Assuming all but the indicated variables are fixed, what value of that variable would make the choice between liquidation and continued operations irrelevant?

- (i) tax rate
- (ii) pre-tax income