Swiss Solvency Test

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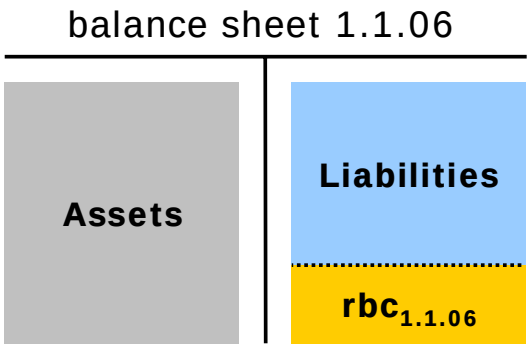
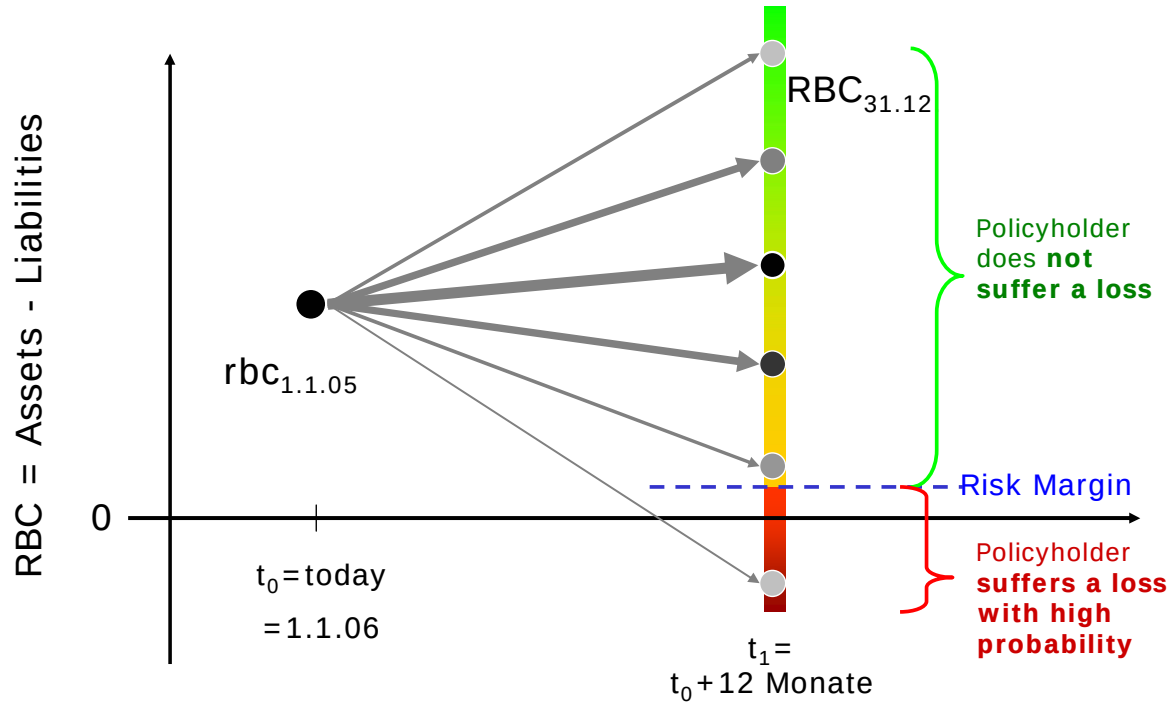
Content

Risk Bearing Capital (RBC) at 1.1.2006



- available / free / economic capital
- = Assets – Liabilities
- based on economic valuation

Change in Available Capital ($rbc_0 \rightarrow RBC_1$)



Target Capital (tc) at 01.01.2006

Target capital is a target quantity. It is the answer to the question:

What is the minimal amount of $\mathbf{rbc_{01.01.06}}$ such that

the policy holder does not suffer a loss with high probability?

⇳

$RBC_{31.12.06}$ > Risk Margin (rm)

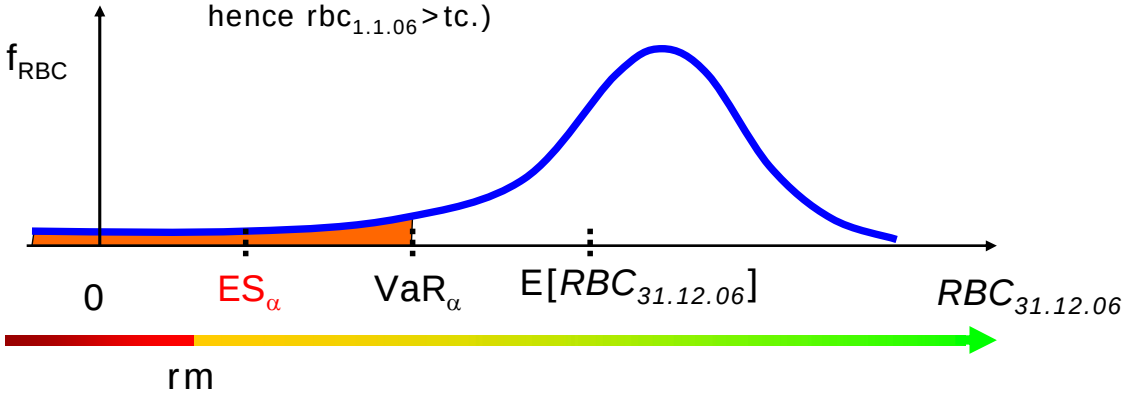
Target Capital (tc) at 01.01.2006

Target Capital *tc* is given by an implicit equation:

$$ES_{\alpha=1\%}\left(RBC_{31.12.06}\,\middle|\,rbc_{1.1.06} = tc_{1.1.06}\right) = rm$$

available required risk margin

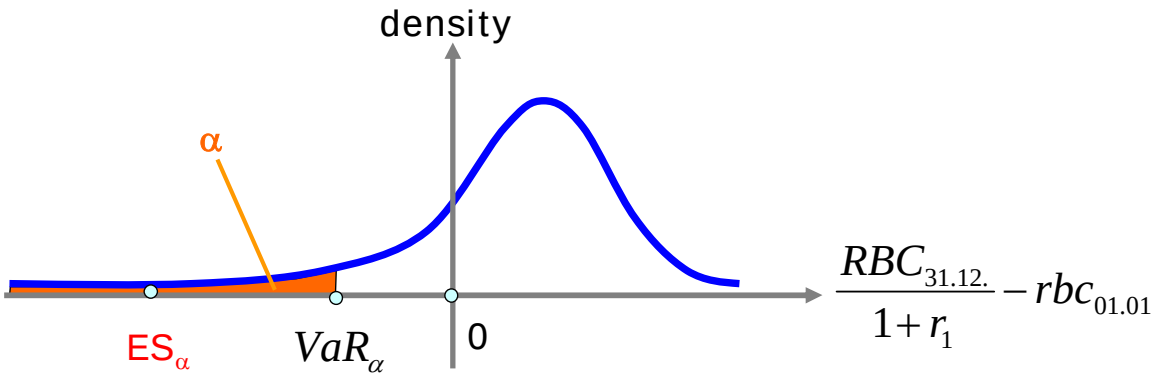
(Picture shows a situation with ES[..] > rm, hence $rbc_{1.1.06} > tc$.)



Target Capital (tc) at 01.01.2006

Solve (approximately) for target capital *tc*:

$$tc_{1.1.06} := -ES_{\alpha=1\%}\left(\frac{RBC_{31.12.06}}{1+r_1^{(1.1.06)}} - rbc_{1.1.06}\right) + rm$$



Result for a Nonlife Insurer

$$tc_{1.1.06} := -ES_{\alpha=1\%}\left(\frac{RBC_{31.12.06}}{1+r_1^{(1.1.06)}} - rbc_{1.1.06}\right) + rm$$

for a nonlife insurer

"0":=1.1.06
"1":=31.12.06

$$\frac{RBC(1)}{1+r_1^{(0)}} - rbc(0) \approx$$

market risk ~N(0,Σ)

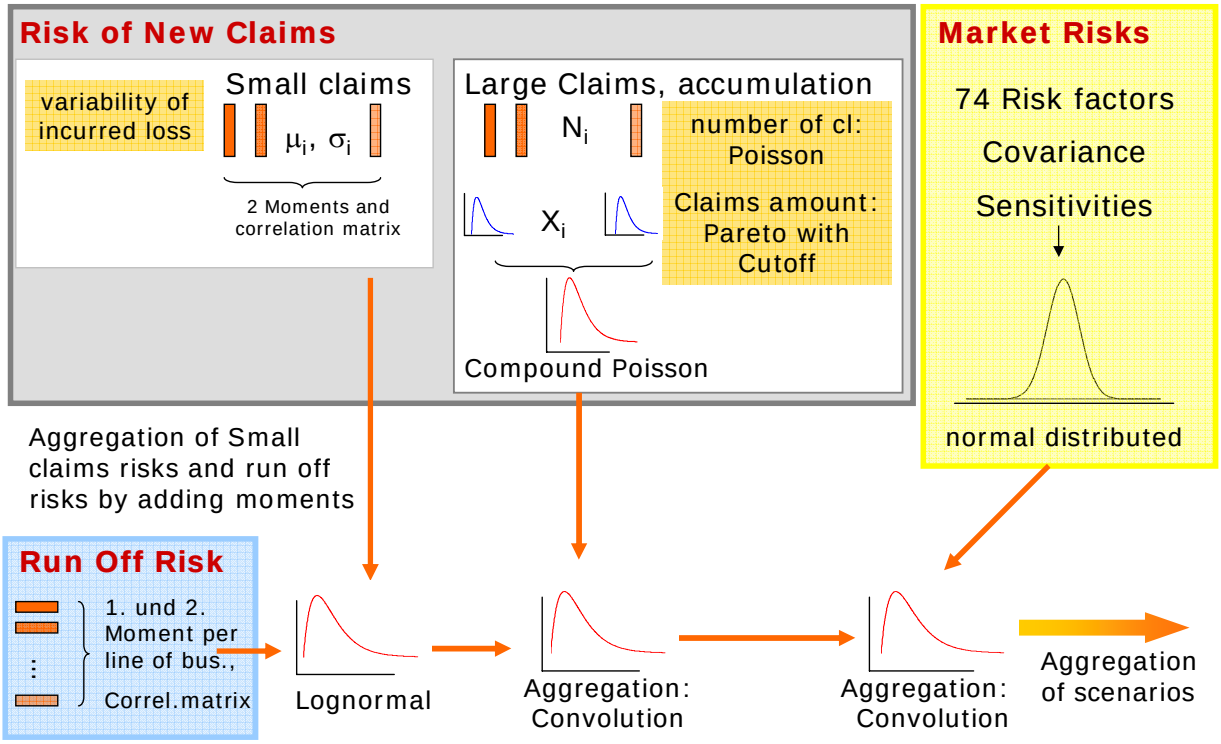
$$\approx \frac{R_I - E[R_I]}{1+r_1^{(0)}} \cdot (a(0) + (p - upr) - c) - \left(\frac{D_{CY}^{(1)}}{1+r_1^{(0)}} - d_{CY}^{(0)}\right) \cdot E[S_{CY}] - \left(\frac{D_{PY}^{(1)}}{1+r_1^{(0)}} - d_{PY}^{(0)}\right) \cdot r_{PY}^{(0)}$$

$$+ \frac{E[R_I] - r_1^{(0)}}{1+r_1^{(0)}} \cdot (a(0) + (p - upr) - c)$$ — expected investment return

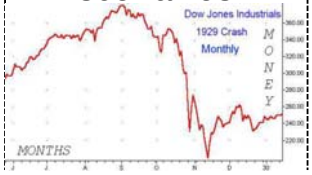
$$+ (p - c) - d_{CY}^{(0)} \cdot E[S_{CY}]$$ — expected insurance result

$$- d_{CY}^{(0)} \cdot (S_{CY} - E[S_{CY}]) - d_{PY}^{(0)} \cdot (C_{PY} - 1) \cdot r_{PY}^{(0)}$$ — insurance risk

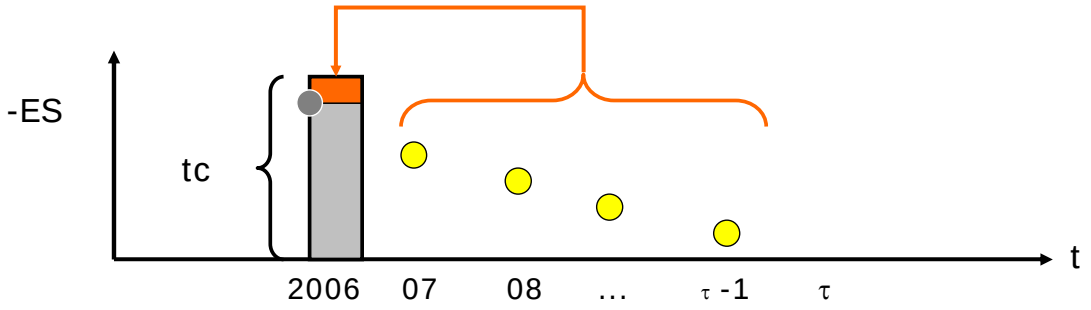
Non Life Standard Model (2005)



Scenarios

Industrial Explosion 	Pandemic 	Accident scenario: works outing	Anti selection for health insurers
Water barrage 	Increasing invalidity	Daily allowance 	Increase total of claims reserve by +10%
Default of Reinsurer	Financial distress	Historic financial scenarios 	Terrorism

Risk Margin (rm)



$$tc_{1.1.06} = -ES\left["\Delta RBC_{2006}"\right] + rm$$

$$rm = \frac{-s \cdot ES\left[\Delta RBC_{07}\right]}{1+r_1^{(1.1.06)}} + \frac{-s \cdot ES\left[\Delta RBC_{08}\right]}{1+r_2^{(1.1.06)}} + \ldots + \frac{-s \cdot ES\left[\Delta RBC_{\tau-1}\right]}{1+r_{\ldots}^{(1.1.06)}}$$

where s = cost of capital rate = 0.06

SST Project

We are looking forward to questions:

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