

Solution 248

$$\begin{aligned} \text{EPV}[\text{Money available for profits and contingencies}] \\ = \text{EPV}[\text{Premiums}] - \text{EPV}[\text{Benefits}] - \text{EPV}[\text{Expenses}] \end{aligned}$$

$$\text{EPV}[\text{Premiums}] = \pi \cdot \ddot{a}_{50:\overline{20}|}$$

$$\begin{aligned} \ddot{a}_{50:\overline{20}|} &= \ddot{a}_{50} - {}_{20}E_{50} \ddot{a}_{70} \\ &= 13.2668 - (0.23047)(8.5693) \\ &= 11.2918 \end{aligned}$$

$$\begin{aligned} \text{EPV}[\text{Premiums}] &= (495)(11.2918) \\ &= 5,589.44 \end{aligned}$$

$$\text{EPV}[\text{Benefits}] = 10,000 \cdot A_{50:\overline{20}|}$$

$$\begin{aligned} A_{50:\overline{20}|} &= 1 - d \cdot \ddot{a}_{50:\overline{20}|} \\ &= 1 - (0.06)(1/1.06)(11.2918) \\ &= 0.36084 \end{aligned}$$

$$\begin{aligned} \text{EPV}[\text{Benefits}] &= (10,000) \cdot (0.36084) \\ &= 3,608.40 \end{aligned}$$

$$\pi = 495$$

$$b = 10,000$$

$$\ddot{a}_{50:\overline{20}|} = 11.2918$$

$$\begin{aligned} EPV[\text{Expenses}] &= 0.30\pi + 0.05\pi \ddot{a}_{50:\overline{20}|} \\ &\quad + 15 + 5\ddot{a}_{50:\overline{20}|} \\ &\quad + 135 + 15\ddot{a}_{50:\overline{20}|} \end{aligned}$$

$$\begin{aligned} EPV[\text{Expenses}] &= 150 + 0.30(495) + (20 + 0.05(495))(11.2918) \\ &= 803.81 \end{aligned}$$

$$EPV[\text{Money available for profit and Contingencies}]$$

$$= 5589.44 - 3608.40 - 803.81$$

$$= 1177.23 \approx 1180$$

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