

**Exercise 4.8**

By noting that  $A_{\overline{x:20}|} = A_{\overline{x:20}|}^1 + A_{\overline{x:20}|}^{\frac{1}{20}}$  and that  $A_x = A_{\overline{x:20}|}^1 + A_{\overline{x:20}|}^{\frac{1}{20}} A_{x+20}$ , then we have

$$A_{\overline{x:20}|}^{\frac{1}{20}} = \frac{A_{\overline{x:20}|} - A_x}{1 - A_{x+20}} = \frac{0.55 - 0.25}{1 - 0.40} = \frac{0.3}{0.6} = 0.50.$$

(a) Based on claims acceleration, we have

$$10000 \bar{A}_{\overline{x:20}|} = 10000 \left[ (1+i)^{1/2} A_{\overline{x:20}|}^{\frac{1}{20}} + A_{\overline{x:20}|}^1 \right] = 10000 [1.03^{1/2}(0.05) + 0.50] = 5,507.445.$$

(b) Based on UDD, we have

$$10000 \bar{A}_{\overline{x:20}|} = 10000 \left[ \frac{i}{\delta} A_{\overline{x:20}|}^{\frac{1}{20}} + A_{\overline{x:20}|}^1 \right] = 10000 \left[ \frac{0.03}{\log(1.03)} (0.05) + 0.50 \right] = 5,507.463.$$