

QUESTION

Using the results of question 4, suppose you want to retire in 35 years time with a total pension fund of £250,000 (or equivalent Euros/Dollars...).

Calculate your pension payments assuming annual compounding, assuming annual growths of

(a) 5%

(b) 15%

This question should teach you never to be an academic.

ANSWER

(a) $T = 35$, $F_T = 250,000$, $r = 5\%$

$$\text{Annual compounding: } d = \frac{250,000 \times 0.05}{(1.05)^{35} - 1} = 2767.93$$

$$\text{m-compounding, say } m = 2: d = 250,000 \left\{ \frac{\left(1 + \frac{0.05}{2}\right)^2 - 1}{\left(1 + \frac{0.05}{2}\right)^{70} - 1} \right\} = 2732.29$$

$$\text{continuous compounding: } d = \frac{250,000(e^{0.05} - 1)}{(e^{0.05 \times 35} - 1)} = 2695.87$$

(b) $T = 35$, $F_T = 250,000$, $r = 15\%$

$$\text{Annual compounding: } d = \frac{250,000 \times 0.15}{(1.15)^{35} - 1} = 283.71$$

$$\text{m-compounding, say } m = 2: d = 250,000 \left\{ \frac{\left(1 + \frac{0.15}{2}\right)^2 - 1}{\left(1 + \frac{0.15}{2}\right)^{70} - 1} \right\} = 247.85$$

$$\text{continuous compounding: } d = \frac{250,000(e^{0.15} - 1)}{(e^{0.15 \times 35} - 1)} = 213.43$$

Note that there is a factor of 10 difference in payments if return can be increased from 5% to 15%. 5% is probably more likely over 35 years!