

EXAM FM QUESTIONS OF THE WEEK

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Week of June 19/06

An investment grows over the three year period from time 0 to time 3 according to the following schedule.

First year: force of interest $\delta_t = .065 + .01t, t \geq 0$.

Second year: nominal annual rate of discount of 8% compounded quarterly.

Third year: nominal annual rate of interest of 6% compounded monthly.

Find the average effective annual rate of interest for the three year period.

The solution can be found below.

Week of June 19/06 - Solution

Growth factor for first year is $e^{\int_0^1 (.065+.01t) dt} = e^{.07}$.

Growth factor for the second year is $(1 - .02)^{-4}$.

Growth factor for third year is $(1.005)^{12}$.

At effective annual interest rate i , the growth in 3 years is

$$(1 + i)^3 = e^{.07}(1 - .02)^{-4} \cdot (1.005)^{12} = 1.2345 .$$

Solving for i results in $i = .0727$.