

Problem Definition

Problem 39. **Effective Rate** Find the effective rate of interest corresponding to a nominal rate of 9% per year compounded (a) annually, (b) semiannually, (c) quarterly, and (d) monthly.

Solution Step 1:

The general formula for interest is

$$r_{eff} = \left(1 + \frac{r}{n}\right)^n - 1$$

We have all the information we need to use this formula.

Solution Step 2:

For (c) we can compute

The following table contains all of the results requested.

$$r_{eff} = \left(1 + \frac{0.09}{4}\right)^4 - 1 \approx 0.0931$$

which translates to an effective interest rate of approximately 9.31%. To get the rest of the results consult the table below.

case	nominal rate (r)	number of periods (n)	effective rate (r_{eff})
(a)	$r = 0.09$	$n = 1$	$r_{eff} = 0.09$ (9%)
(b)	$r = 0.09$	$n = 2$	$r_{eff} = 0.092$ (9.2%)
(c)	$r = 0.09$	$n = 4$	$r_{eff} = 0.0931$ (9.31%)
(d)	$r = 0.09$	$n = 12$	$r_{eff} = 0.0938$ (9.38%)