

Chapter5 preview

1. What is the difference between Effective Annual Rate and Annual Percentage Rate?

- **Effective Annual Rate (EAR):** This is the interest rate that accounts for **compounding** during the year. It reflects the actual rate of return over a year.
- **Annual Percentage Rate (APR):** This is the **simple interest rate** expressed annually, **not accounting for compounding** within the year.

Thus, EAR is always equal to or greater than APR when compounding occurs more than once a year.

2. For an interest rate of 12% per year, determine the effective rates for:

The general formula for EAR is:

$$EAR = \left(1 + \frac{APR}{k}\right)^k - 1$$

where k = number of compounding periods per year.

(a) Quarterly compounding (k = 4):

$$EAR = \left(1 + \frac{0.12}{4}\right)^4 - 1 = (1.03)^4 - 1 = 12.55\%$$

(b) Monthly compounding (k = 12):

$$EAR = \left(1 + \frac{0.12}{12}\right)^{12} - 1 = (1.01)^{12} - 1 = 12.68\%$$

These calculations show that more frequent compounding results in a higher effective annual rate.

3. Define Continuous Compound Interest

Continuous compounding assumes **interest is compounded an infinite number of times per year**.

It uses the exponential function:

$$EAR = e^{APR} - 1$$

In practice, continuous compounding is mostly used in theoretical finance rather than real-world loans or deposits.

4. Brief Explanation of the Following Terms

Amortizing Loans

These are loans that are repaid in equal periodic installments, which include both interest and principal repayment. Over time, the portion of the payment going toward principal increases, while interest decreases.

Real Interest Rate

This adjusts the nominal interest rate for inflation. It reflects the true increase in purchasing power and is approximated by: Nominal Rate - Inflation Rate

Term Structure

The term structure of interest rates shows how interest rates vary with maturity. It reflects expectations about inflation, interest rate risk, and future monetary policy.

Yield Curve / Inverted Yield Curve

- The yield curve is a graphical representation of the term structure. A normal yield curve is upward sloping.

- An inverted yield curve occurs when short-term rates are higher than long-term rates. This is often viewed as a predictor of a recession.

Opportunity Cost of Capital

This is the best available return offered by investments of comparable risk and maturity. It serves as the discount rate when evaluating investment opportunities.