1.Time Value

Interest Rate

Interest rate is a compensation

$$r = R_f + IRP + DRP + LRP + MRP$$

- R_f the risk-free real rate
- IRP, **inflation** risk premium → change in purchasing power
- DRP, **default** risk premium → possibility of borrower's default
- LRP, **liquidity** risk premium → conversion to cash
- MRP, **maturity** risk premium → market value of long-term debt

Equivalent annual rate (EAR)

compounding will occur in one year.
Equivalently,

$$EAR = (1 + r_m)^m - 1$$

In case of continuous compounding:

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

Time Value of Money(TVM)

1. $PV(C\ in\ perpetuity) = \frac{C}{r}$ **remember that the first cash flow is in the start of year 1 (the end of year 0)**

   $PV(C\ in\ N\ years) = \frac{C}{r} - \frac{C}{r}\frac{1}{(1+r)^N} = \frac{C}{r}\left(1 - \frac{1}{(1+r)^N}\right)$

   $\text{PV(growing perpetuity)} = \frac{C}{r-g}$ **if we know C0 then C=C0*(1+g)!!**

   $\text{PV(growing annuity in N years)} = \frac{C}{r-g}\left(1 - \left(\frac{1+g}{1+r}\right)^N\right)$

2. $FV(C\ in\ N\ years) = \frac{C}{r}\left((1+r)^N - 1\right)$