Formula File

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$E[X] = \sum p_i * \text{Face\_value(bond)}$

$Var = E[X^2] - E[X]^2$

$P_0(1 + r)^T = P_1$

Special Case:

$FV/(1+r) + FV/(1+r)^2 + FV/(1+r)^3 \ldots = FV/r[1-1/(1+r)^T]$

$FV = (1+r/n)^{nT}$

Choice Sets (m is income, c is consumption, p is price)

slope = -p1(Horizontal/x-axis)/p2(vertical/y-axis)

c2 = m2 + (1 + r) (m1 — c1)

$P1 = P0e^{rT}$ (If return is continuous)

Perpetuities

PV = C/r - From next year return

PV = C+C/r - From current year return

PV = C/r-g - For growth, g, on investment on every time period

Annuities

$PV = C/r[1-1/(1+r)^T]$

$FV = C^* ((1-r)^T - 1)/r$

$$PV = \frac{C}{r-g}\left[1 - \left(\frac{1+g}{1+r}\right)^T\right]$$

Arbitrage Opportunity

1 + r > p1/p0

1+r = p1/p0 - No arbitrage condition

Loan and Balance Payment

$B_m = P * ((1+r)^n - (1+r)^m)/((1+r)^n -1)$

$EMI = P*r/[1 - 1/(1+r)^T]$, r = Monthly interest rate, T = years*12

Forward- Looking Dividend Yield

Dividends D Next Year/Stock Price P today = r — g

Profitability Index = NPV/ - payout

Maturity and Duration

$$Duration = \frac{\sum C_t t}{\sum C_t}$$

$$Macauley's\ Duration = \frac{\sum C_t t}{\sum C_t}\ , C_t = NPV$$

CPI and Inflation

CPI = cost of basket in current year/cost of basket in base year * 100

Inflation = Year to year change in CPI starting from base year.

Nominal and Real GDP

Nominal GDP = $\sum$ cost*quantity , cost and quantity from current year

Real GDP = $\sum$ cost*quantity , cost from base year and quantity from current year

GDP Deflator = Nominal GDP/Real GDP

Interest Rates

$r_t = P_t(1+i_t)/P_{t+1} - 1$

$r_t = (1+i_t)/(1+\prod_{t+1}) - 1$ i_t : Nominal interest rate, $\prod_{t+1}$: Inflation

$r_t \approx i_t - \prod_{t+1}$

Holding rate of return = $(1+r)^T - 1$