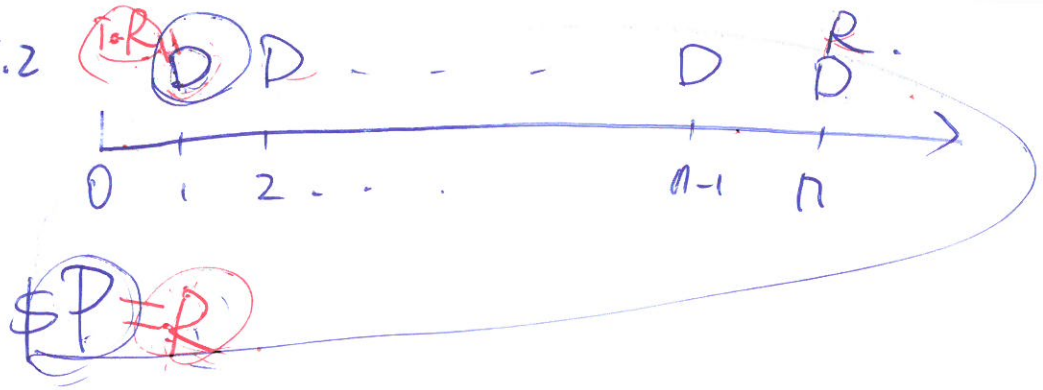
LNS.2



$$P = D \cdot a_{\overline{n}|i} + R \cdot v_i^n$$

① Find P.

Given $D=5$, $R=125$, $i=5\%$, $n=10$.

$$P = 5 \cdot \underbrace{a_{\overline{10}|0.05}}_{7.7217} + 125 \cdot \underbrace{v_{0.05}^{10}}_{0.61391}$$

$$= 115.3473$$

② Find P. $\boxed{i \cdot R = D}$

Given. $D=6.25$, $R=125$, $i=5\%$. $n=20$.

$$P = 125 \overset{?}{=} R.$$

Pf: $P = i \cdot R \cdot a_{\overline{n}|i} + R \cdot v_i^n$

$$= iR \cdot \left(\frac{1-v_i^n}{i}\right) + R \cdot v_i^n$$

$$= R.$$

Ex: ③. Find R.

Given $D=3$, $P=100$, $i=5\%$, $n=15$.

$$100 = 3 \cdot a_{\overline{15}|5\%} + R \cdot v_{0.05}^{15}$$

$$=$$

④. Find n.

Given, $D=2.8883$, $P=100$, $i=5\%$, $R=130$.

$$100 = 2.8883 \cdot a_{\overline{n}|5\%} + 130 \cdot v_{0.05}^{n}$$

$$= 2.8883 \cdot \left(\frac{1-v_{0.05}^{n}}{0.05}\right) + 130 \cdot v_{0.05}^{n}$$

$$= 57.766 + 72234\, v_{0.05}^{n}$$

$$\Rightarrow v_{0.05}^{n} = 0.58468$$

$\Rightarrow n = 11$ (Tables)

Ex: $a^{(12)}_{\overline{10}|0.05} = \frac{i}{i^{(12)}} \cdot a_{\overline{10}|0.05} \simeq 7.8971$.

$i^{(12)} = 1.0022715$, $a_{\overline{10}|0.05} = 7.7217$

Inflation.

$$i = \frac{120-100}{100} = 20\%.$$

$r = 5\%$ .. Inflation rate

Real interest rate i' ?

M1: $t=0$ → units of (purchasing power at $t=0$).

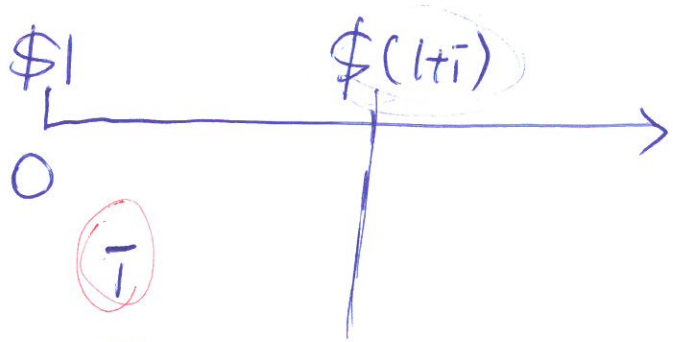
$$\frac{\$120}{1+r} = \frac{\$120}{1.05} = \$114.29$$

$\Rightarrow$ Real interest rate $= \frac{\$114.29 - \$100}{100} = 14.29\%$.

M2: $t=1$

$100 \times 5\% = 105$.

$\Rightarrow$ Real interest rate $= \frac{\$120-105}{105} = 14.29\%$



r

$$\bar{i}' = \frac{(1+\bar{i}) - k(1+r)}{k(1+r)} = \frac{\bar{i}-r}{1+r}.$$

$$(1+\bar{i}) = (1+r)\cdot(1+\bar{i}') \iff \frac{1}{1+\bar{i}} = \frac{1}{(1+r)\cdot(1+\bar{i}')}$$

$\bar{i}$ — money; r — inflation; $\bar{i}'$ — real.

$$\Updownarrow$$

$$v_{\bar{i}} = v_r \cdot v_{\bar{i}'}$$

$$1+\bar{i}' = \frac{1+\bar{i}}{1+r}$$

$$\sum_{k=1}^{n} I_{t_k} \cdot (1+\bar{i})^{-t_k} + \int_0^n \rho_t(t)\,(1+\bar{i})^{-t}\,dt =$$

$$(1+\bar{i}')^{-t_k}\cdot(1+r)^{-t_k} \qquad (1+\bar{i}')^{-t}\cdot(1+r)^{-t}.$$