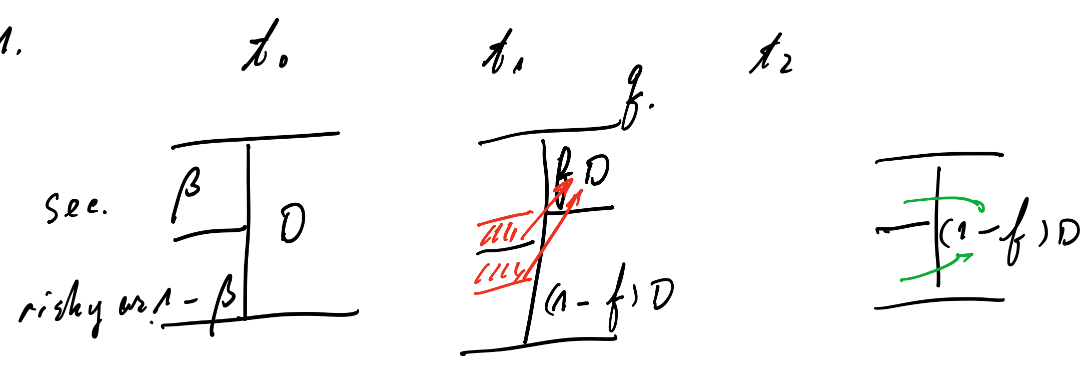
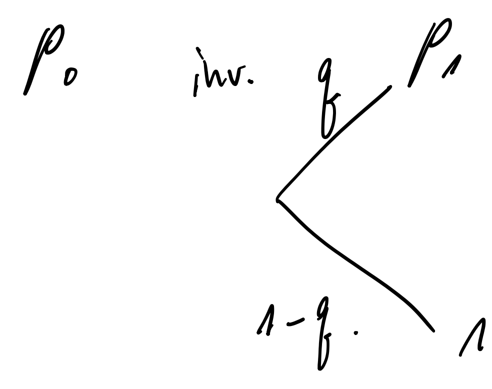
Problem Set 3

Friday, 22 September 2017 11:40

1. t_0 t_1 t_2



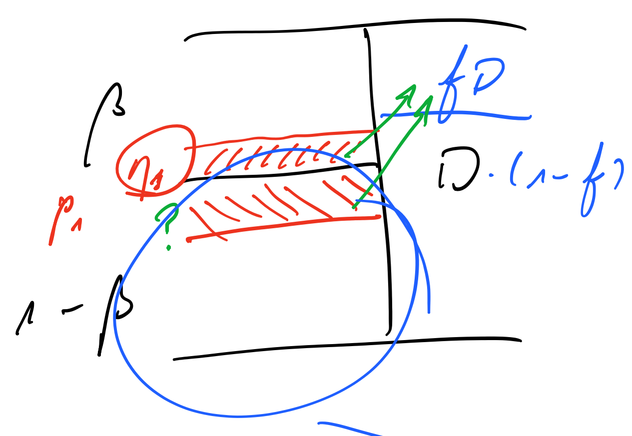


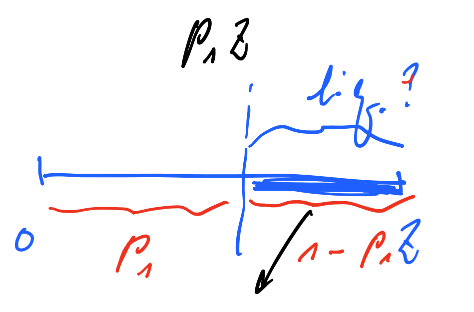
1. buy at t_0, return: $\frac{1}{p_0}$

t_1, return: $q\frac{1}{p_1} + (1-q)\cdot 1$

$\Rightarrow$ indifferent: $\frac{1}{p_0} = q\cdot\frac{1}{p_1} + (1-q)\cdot 1$

2.





$E[l \mid l \geq p_1 Z]$

$= \frac{p_1 Z + Z}{2}$

Prob. $(l \geq p_1 Z)$

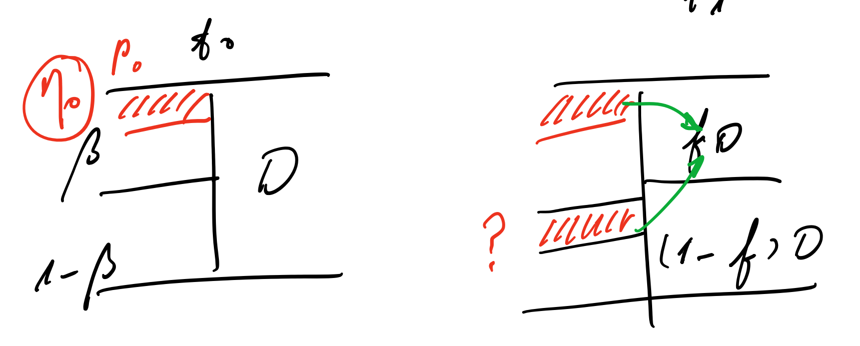
$= \frac{Z - p_1 Z}{Z}$

$= 1 - p_1$

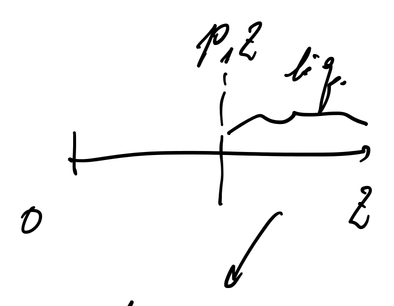
$\underbrace{\eta_1 \beta p_1 Z}_{\text{selling sec.}} + \underbrace{(1-\beta) \text{Prob}(l \geq p_1 Z) E[l \mid l \geq Z p_1]}_{\text{liq.}} = fD$

$\Rightarrow \eta_1 = \frac{fD}{\beta Z p_1} - \frac{(1-\beta)(1-p_1^2)}{2\beta p_1}$.

3. what if sell p_0 ?



$\underline{l \geq p_1 Z}$!



Prob. $(l \geq p_1 Z) = 1 - p_1$

$E[l \mid l \geq p_1 Z] = \frac{Z + p_1 Z}{2}$

$\underbrace{\eta_0 \beta p_0 Z}_{\text{liq. inf. } t_0}$

$+ \underbrace{(1-\beta) \text{Prob}(l \geq p_1 Z) E[l \mid l \geq Z p_1]}_{\text{liq.}} = fD$

4. ① if sell at t_1

$\Pi(\eta_1) = q\Big[\underbrace{(1-\eta_1) Z}_{\text{unsold sec.}} + \overbrace{(1-\beta)\underbrace{\text{Prob}(l \leq p_1 Z)}_{p_1} \cdot Z}^{\text{unliq. ass.}}$

$- (1-f) D\Big]$

$+ (1-q)(Z - D)$

② if sell at t_0

$\Pi(\eta_0) = q\Big[\overbrace{(1-\eta_0)\beta Z}^{\text{unsold sec.}} + \overbrace{(1-\beta) \text{Prob}(l \mid l \leq p_1 Z) Z}^{\text{unliq.}}$

$- (1-f) D\Big]$

$+ (1-q)\Big[\underbrace{\eta_0 \beta p_0 Z}_{\text{buffer. } t_0} + \overbrace{(1-\eta_0)\beta Z}^{\text{unsold. sec}}$

$+ \underbrace{(1-\beta) Z}_{\text{assets.}} - D\Big]$

if investors are indiff: $\boxed{\frac{1}{p_0}} = q\cdot\frac{1}{p_1} + (1-q)\cdot 1$

$\Rightarrow \Pi(\eta_0) = \Pi(\eta_1)$

$\underline{\text{gambling}}$ $\underline{p_0} > p_0$

2. priv. $\begin{cases} \text{good: } R = 1 \\ \text{bad: } R = 0 \end{cases}$

reservation value

$\underline{R} = \frac{1}{2} R$

1. all sold. (good. / bad

investor: $p \leq E[R] = \frac{1}{2}\cdot 1 + \frac{1}{2}\cdot 0 = \frac{1}{2}$

bad: $p \geq \underline{R} = \frac{1}{2} R = 0$

good: $p \geq \underline{R} = \frac{1}{2} R = \frac{1}{2}$

$\Rightarrow p = \frac{1}{2}$

2. only bad $R = 0$:

investors: $p \leq E[R] = 0$

bad sellers: $p \geq \underline{R} = 0$

$\Rightarrow p = 0$

3. what if $\underline{R} = R$?

– ✗ if both on sale: good. + bad

inv. $p \leq E[R] = \frac{1}{2}$

good: $p \geq \underline{R} = 1$

bad: $p \geq \underline{R} = 0$

$\Rightarrow$ no price

– ✓ if only bad on sale:

inv. $p \leq E[R] = 0$

bad: $p \geq \underline{R} = 0$

$\Rightarrow p = 0$

– ✗ if only good:

inv $p \leq E(R) \not= 1$

good: $p \geq \underline{R} = 1$

$\Rightarrow$ bad: mimic: $p \geq \underline{R} = 0$