Review Section

2.1) $\tau_p = 0.37$

$\tau_c = 0.21$

$\tau_d = 0.2$

$100

a) $\tau_c \cdot \$100 = \$21$

b) $\tau_d(\$100)(1-\tau_c)$

$= 0.2(79) = \$15.8$ on top of corp tax.

c) $\tau_p(100) = \$37$

$\Rightarrow$ S-corp doesn't matter divided policy.

2.1.2) Optimal K

$F(K) = pY - wL$

$$\boxed{Y = L^{1/2} K^{1/2}}$$

$L = 1$, $w = 1$

$p = 8$, $r = 1$

a) $\max \pi = F(K) - rK$

$\max \pi = pY - wL - rK$

$$\max_{K} \pi = p\left(\cancel{L}^{1/2} K^{1/2}\right) - \cancel{w}\cancel{L} - rK$$

$$[K] : \frac{\cancel{8}^{4}}{\cancel{2}K^{1/2}} - 1 = 0$$

$$K^{1/2} = 4 \Rightarrow \boxed{K^* = 16}$$

b) $\pi = 8\left(1^{1/2} \cdot 16^{1/2}\right) - 1 - 1(16)$

$\pi = 8(4) - 1 - 16$

$$\boxed{\pi = 15}$$

c) $\tau_c = 0.25$ doesn't deduct K expenditure

$$\max_{K} \; (1-\tau_c)F(K) - rK$$

$$\max_{K} \; 0.75\left(A L^{1/2} K^{1/2} - wL\right) - rK$$

$$\max_{K}\ 0.75\left(8(K)^{1/2} - 1\right) - (1)K$$

$$[K]:\ \frac{3}{K^{1/2}} - 1 = 0$$

$$K^{1/2} = 3 \Rightarrow \boxed{K^* = 9}$$

d) $\pi_c \cdot F(K)$

$$0.25\left(\underbrace{p}_{=8}\, K^{1/2}\, \underbrace{L^{1/2}}_{=1} - \underbrace{wL}_{=1}\right) =$$

$$k = 9$$

$$= 0.25\left(8\sqrt{9} - 1\right) = \boxed{5.75}$$

e) $\underbrace{\tau_c}\cdot\underbrace{rK}$

K expenditure

$$\text{Max } \pi = (1-\tau_c)F(K) - rK + \tau_c(rK)$$

$$\text{Max } \pi = \boxed{(1-\tau_c)}\underbrace{\left[F(K) - rK\right]}$$

$$\boxed{k^* = 16}$$

<u>Rev</u>: $\tau_c \left(F(k) - rk \right)$

$$= 0.25 \left(8(16)^{1/2} - 1 - 1(16) \right)$$

$$= 0.25(15) = \boxed{3.75}$$

2.2) $MC_A = 2Q + 3$

$MB_A = 18 - Q$

$$\boxed{MC_B = 3Q + 3}$$

a) $MC_A = MB_A$

$2Q + 3 = 18 - Q$

$3Q = 15$

$$\boxed{Q_{FM} = 5}$$

b) $SMC = MC_A + MC_B$

$$= (2Q + 3) + (3Q + 3)$$

$$= \boxed{5Q + 6}$$

$$SMB = 0 + 18 - Q$$

$$SMC = SMB$$

$$5Q + 6 = 18 - Q$$

$$6Q = 12$$

$$\boxed{Q_{so} = 2}$$

c) $MC_B = SMC \quad \forall Q$

$$MC_A + t = SMC$$

$$2Q + 3 + t = 5Q + 6$$

$$\boxed{t = 3Q + 3}$$

d) $MC_A + t = SMC$

$$2Q + 3 + t = 5Q + 6$$

$$\boxed{Q_{SO} = 2}$$

$$4 + 3 + t = 5(2) + 6$$

$$\boxed{t = 9}$$

4) $w \begin{cases} 10, & \text{if not injured} \\ 0, & \text{if injured} \end{cases}$

s is prob of injured.

$$E[U] = (1-s)\ln(w-p) + s\ln(b-p) - (1-s)^2$$

a) $b = 10$

$$p = s\,b = 0.1(10) = 1$$

b) $$\max E[U] = (1-s)\ln(\underbrace{w-p}_{=9}) + s\ln(9) - (1-s)^2$$

$$\boxed{\max_s \ln(9) - (1-s)^2}$$

$$\boxed{s = 0.99}$$

c) w^{-p}

$$\begin{cases} 9 = 10 - 1 \\ 9 = 0 + 10 - 1 \end{cases}$$

$$E[U] = \ln 9 - (1-s)^2$$

$$= \ln 9 - (0.01)^2 \simeq 2.2$$

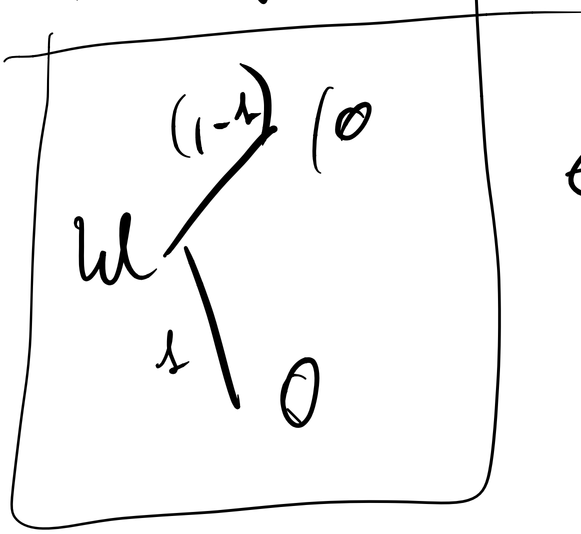
d) $p = s \cdot b = 0.99(10) = 9.9$

e) $E[U] = \ln(10 - 9.9) - (0.01)^2$

1

$$= \ln(0.1) - 0.0001 \approx \boxed{-2.3}$$

4) They would still choose Plan #2.



Expected Utility w/ no insurance:

$$E[U] = s\ln(0) + (1-s)\log(10)$$

$$s\ln(0) \to -\infty \qquad \to \boxed{-\infty}$$

3) Public Goods

$$H^{Tot} = H_A + H_B$$

I_i = income

X_i = private

Budget: $X_A + H_A = I$

$$U_A = \ln(X_A) + \ln(H_A + H_B)$$

$$U_B = \ln(X_B) + \ln(H_A + H_B)$$

a) $\mathcal{L} = \ln(X_A) + \ln(H_A + H_B) +$

$$\lambda\left(I - X_A - w H_A\right)$$

$$[X_A]: \frac{1}{X_A} - \lambda = 0 \Rightarrow \boxed{\lambda = \frac{1}{X_A}} \quad (1)$$

$$[H_A]: \frac{1}{H_A + H_B} - w\lambda = 0 \Rightarrow \boxed{\lambda = \frac{1}{w(H_A + H_B)}} \quad (2)$$

$(1)+(2)$:

$$\frac{1}{X_A} = \frac{1}{w(H_A + H_B)}$$

$$X_A = w\left(H_A + H_B\right) \qquad (3)$$

Budget:

$$\boxed{I = X_A + w H_A} \qquad (4)$$

(3) in (4):

$$I = w\left(H_A + H_B\right) + w H_A$$

$\Rightarrow$ Symmetry: $H_A = H_B$

$$I = 2w H_i + w H_i = 3w H_i$$

$$\boxed{H_i^* = \frac{I}{3w}}$$

$$H_A + H_B = \boxed{\frac{2I}{3w}}$$

b) $\underline{\underline{x_A}}$, $\underline{\underline{x_B}}$, $\underline{\underline{H_A}}$, $\underline{\underline{H_B}}$

Social planner solution :

$$\mathcal{L} = \ln(x_A) + \ln(x_B) + 2\ln(H_A + H_B) + \lambda_1 (I - x_A - H_A) + \lambda_2 (I - x_B - H_B)$$

(a) $$\frac{\partial \mathcal{L}}{\partial x_A} = \frac{1}{x_A} - \lambda_1 = 0 \Rightarrow \lambda_1 = \frac{1}{x_A} \quad (5)$$

(b) $$\frac{\partial \mathcal{L}}{\partial x_B} = \frac{1}{x_B} - \lambda_2 = 0 \Rightarrow \lambda_2 = \frac{1}{x_B} \quad (6)$$

(c) $$\frac{\partial \mathcal{L}}{\partial H_A} = \frac{2}{H_A + H_B} - w\lambda_1 = 0 \quad (7)$$

(d) $$\frac{\partial \mathcal{L}}{\partial H_B} = \frac{2}{H_A + H_B} - w\lambda_2 = 0 \quad (8)$$

$2H_B$

(5) and (6) in (7) and (8):

$$\frac{2}{H_A+H_B} = \frac{w}{X_A} = \frac{w}{X_B}$$

$$\Rightarrow X_A = X_B = wH_A = wH_B$$

Budget: $I = \overbrace{X_A}^{=wH_A} + wH_A$

$$I = 2wH_A$$

$$\boxed{H_A = \frac{I}{}}$$

$2n$

$$\boxed{H_B = \frac{I}{2n}}$$

c) Yes bc planner considers external benefits on other parties.

d) $I_A = 300$ $\quad$ $I_C = 900$

$I_B = 600$

$$\boxed{H_i = \frac{I_i}{2w}}$$

$$H = H_A + H_B + H_C$$

$$H = \frac{300}{2w} + \frac{600}{2w} + \frac{900}{2w} = \frac{900}{w}$$

$$H(w = 30) = \frac{900}{30} = \boxed{30}$$

c) $a + b + c = 1$

$w = 30$

$a = b = c = \frac{1}{3}$

$\Rightarrow$ Each pays \$10

$$M_A = \frac{30\cancel{0}}{2(\cancel{10})} = 15$$

$$M_B = \frac{600}{2(10)} = 30$$

'

$$M_C = \frac{900}{2(10} = 45$$

f) $$M_A = \frac{\cancel{300}^{10}}{\cancel{30}(2 * a)} = 30$$

$$2a = \frac{1}{3} \Rightarrow \boxed{a = \frac{1}{6}}$$

$$M_B = \frac{600}{30(2 * b)} = 30 \Rightarrow \boxed{b = \frac{1}{3}}$$

$$M_c = \frac{\cancel{900}^{30}}{\cancel{30}(2c)} = \cancel{30}$$

$$\boxed{c = \frac{1}{2}}$$

g) Median voter (= Ben) always wins.

4) g_A level of public goods in A

g_B

$$U_i = 10 - |g_c - i|$$

$$U_3 = 10 - |g_B - 3|$$

a) $\boxed{q_A = 1}$

$\boxed{q_B = 10}$

Individuals from 1 - 5 live in A

from 6 - 10 live in B

b) $\boxed{q_C = 5.5}$

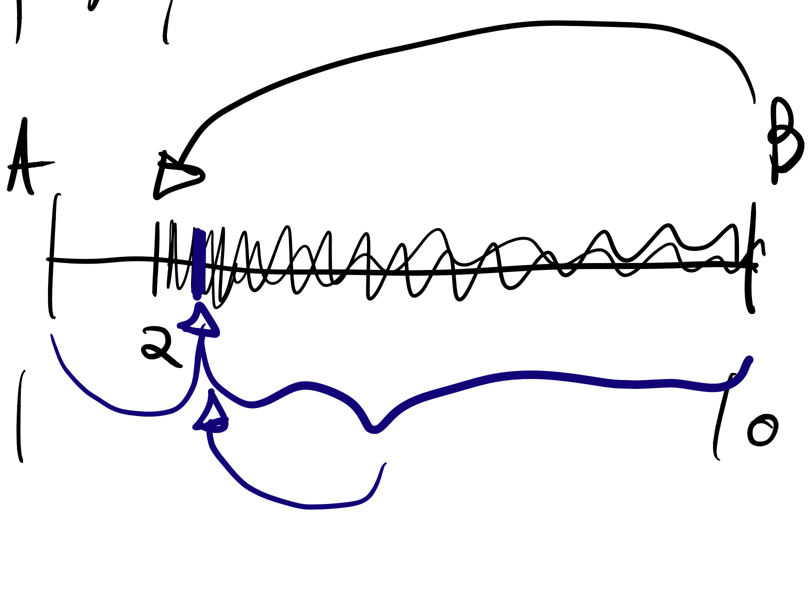
1 - 3 : live in A

⇒ 4, 5, 6, 7 : live in C

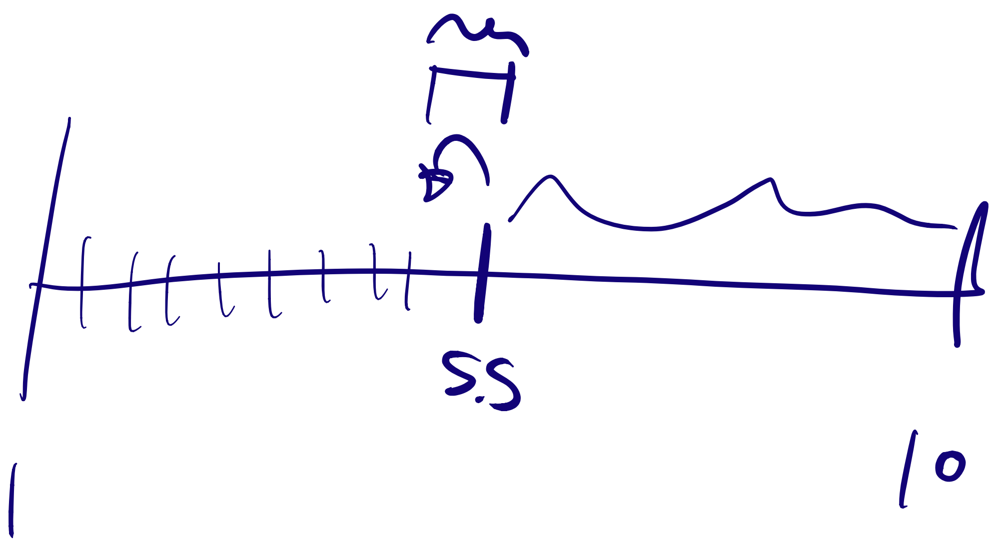
8, 9, 10 : live in B

c) No cost for new cities: each person leave their own city.

d) A, B



$y_c = 5.5$



$$y_c = \frac{1+10}{2} = \frac{11}{2} = 5.5$$