ECON 610 — 2014 EXAM 2

SCHLESINGER Solutions (Sketch)

1. (a) False. $y = x_1^a x_2^b$

$\sigma = 1$ for any a, b but CRS iff $a + b = 1$

(b)

The x to produce output y is unique

$x^* = f^{-1}(y)$

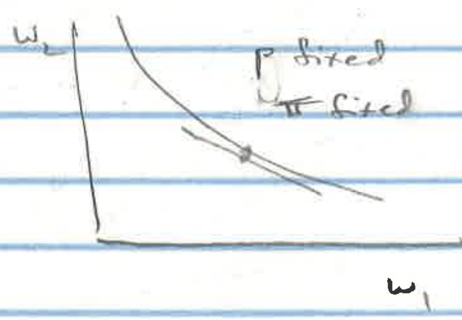
So cost $c(y, w) = w[f^{-1}(y)]$, which is linear in w

(c) FSD $\Rightarrow$ $F(t) \le G(t) \;\forall t$ (1)

SSD $\Rightarrow$ $\int_a^{t_0} F(t)\,dt \le \int_a^{t_0} G(t)\,dt \;\forall t_0$ (2)

Obvious that (1) $\Rightarrow$ (2) TRUE

(d)



$\pi(p, w_1, w_2) = \text{Konstant}$

$\text{Slope} = \frac{dw_2}{dw_1}$

Use Hotelling's Lemma

$$\frac{dw_2}{dw_1} = -\frac{\partial\pi/\partial w_1}{\partial\pi/\partial w_2} = \frac{-x_1(p, w_1, w_2)}{x_2(p, w_1, w_2)}$$

True

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(2)(a) $X_1 = \frac{1}{2} e^y \left(\frac{w_2}{w_1}\right)^{1/2}$ $X_2 = \frac{1}{2} e^y \left(\frac{w_2}{w_1}\right)^{-1}$

(b) $X_1 X_2 = \frac{1}{4} e^{2y} \Rightarrow e^{2y} = 4 X_1 X_2$

Take logs $2y = \ln 4X_1X_2$

$y = \frac{1}{2} \ln 4x_1x_2$

$y = \ln \sqrt{4x_1x_2} = \ln 2 + \frac{1}{2} \ln x_1 x_2 = -$

3(a) $X_1 = y$ or $X_2 = \frac{1}{2} y \Rightarrow \text{cost} = w_1 y$ or $\frac{1}{2} w_2 y$

$\Rightarrow C(y, w_1, w_2) = \min(w_1, \frac{1}{2} w_2) y$

(b) $\pi = \frac{1}{4} p^2 (w-p)^{-1}$

(i) $x = -\partial\pi/\partial w = \frac{1}{4} \frac{p^2}{(w-p)^2}$

(ii) $y = \frac{\partial \pi}{\partial p} = -\frac{1}{4} \frac{p^2}{(w-p)^2} + \frac{1}{2} \frac{p}{w-p} = \frac{1}{4} \frac{(2pw - p^2)}{(w-p)^2} = \frac{p}{4}\left(\frac{2w-p}{w-p}\right)$

(iii) $y = x + \sqrt{x}$

From (i) $\frac{p}{w-p} = 2\sqrt{x}$ $y = \frac{1}{2}\left(\frac{p}{w-p}\right) + \frac{1}{4} \frac{p^2}{(w-p)^2}$

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4. $\max\ (1-p)\, u(W-(1+\lambda)pI) + p\, u(W-(1+\lambda)pI - L + I)$

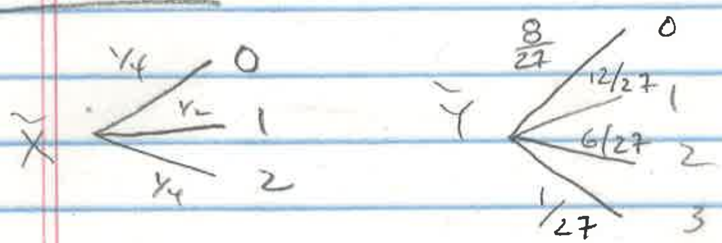
(a) $\dfrac{dEU}{dI} = -(1+\lambda)p(1-p)\, u'(W-P) + p(1-(1+\lambda)p)\, u'(W-P-L+I)$

if $I=L$ $\dfrac{dEU}{dI} = -(1+\lambda)p(1-p)u'(W-P) + p(1-(1+\lambda)p)\, u'(W-P) < 0$

(b) $Eu = -\left[(1-p)e^{-kW} e^{k(1+\lambda)pI} + p e^{-kW} e^{k[(1+\lambda)pI+L-I]}\right]$

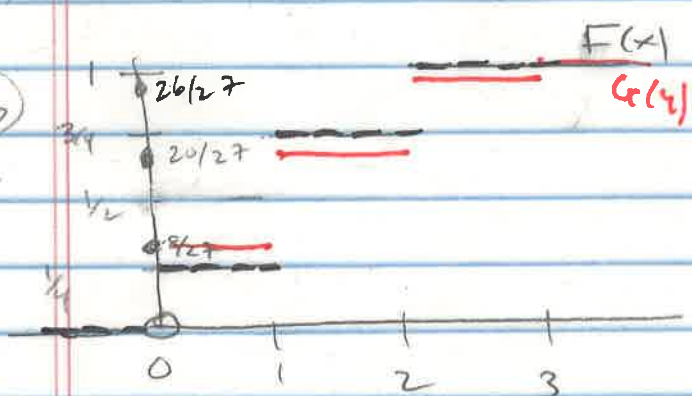
$= e^{-kW}[\quad]$ $\Rightarrow$ Optimal I^* indep of W

5.



(a) Same mean → No FSD

(b)



Area under F = Area under G

$\int_0^t F(t)\,dt \le \int_0^t G(t)\,dt \quad \forall t$

$\Rightarrow$ F SSD G