

Answers to Homework #4

1. a) $2000 + \frac{1100}{1.1} = 3000$

b) $(1.1)2000 + 1100 = 3300$

c) see graph

d) $MRS = \frac{\partial U / \partial C_1}{\partial U / \partial C_2} = \frac{C_2}{C_1}$

e) -1.1

f) $2000 + \frac{1100}{1.1} = C_1 + \frac{C_2}{1.1} \Rightarrow 3000 = C_1 + .91C_2$

or, using future values

$$2000(1.1) + 1100 = (1.1)C_1 + C_2$$

$$3300 = 1.1C_1 + C_2$$

g) $\frac{C_2}{C_1} = 1.1$

h) $\frac{C_2}{C_1} = 1.1$

$$C_2 = 1.1C_1$$

$$3300 = 1.1C_1 + C_2 = 1.1C_1 + 1.1C_1 = 2.2C_1$$

$$C_1 = \frac{3300}{2.2} = 1500 \quad C_2 = 1650$$

i) see diagram

j) $I_1 = 2000$ $C_1 = 1500$, so he saves 500

k) see diagram

l) $\frac{C_2}{C_1} = 1.2$

BC: $2000 + \frac{1100}{1.2} = C_1 + \frac{C_2}{1.2}$

$$2917 = C_1 + .83C_2$$

$$2917 = C_1 + 1.2(.83)C_1$$

$$2917 = 1.996 C_1$$

$$C_1 = 1461$$

$$C_2 = 1753$$

still saves 539

2.a) First, figure out current consumption

$$MRS = \frac{C_2}{C_1} = 1.1 \quad C_2 = 1.1 C_1$$

$$BC - \text{Future Value } 50,000(1.1) = C_1(1.1) + C_2$$

$$55000 = 2C_2$$

$$C_2 = 27500$$

$$C_1 = 25000$$

So Mr Smith is a saver

Since Mr Smith is a saver, if $i \uparrow$

income effect $\rightarrow \uparrow C_1, \uparrow C_2$

substitution effect $\rightarrow \downarrow C_1, \uparrow C_2$

So we can't tell what will happen to C_1

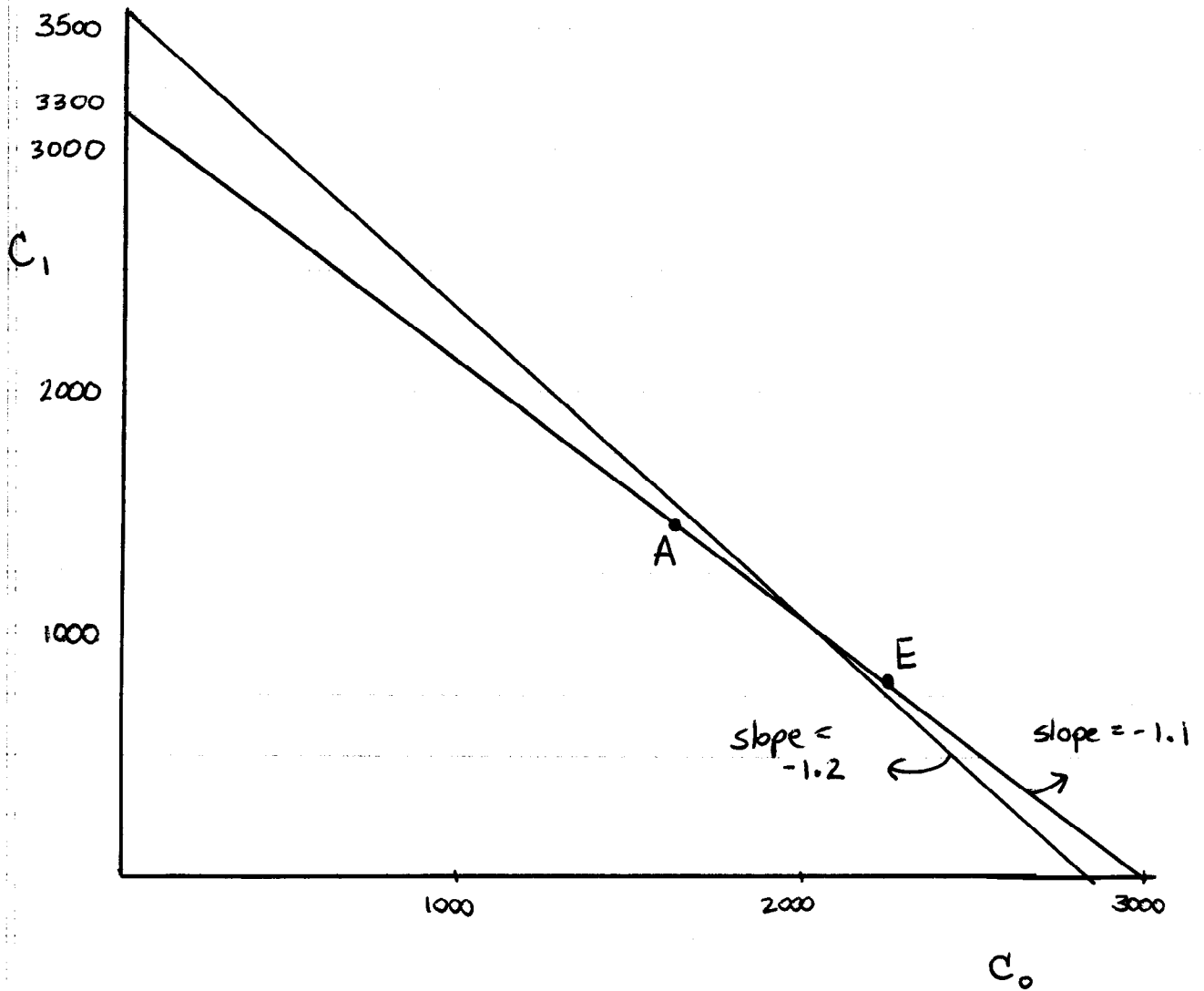
b) C_2 will \uparrow (see above)

c) If all income comes in the second period, then Mr Smith is a borrower

$\uparrow i \Rightarrow$ income effect \rightarrow poorer $\rightarrow \downarrow C_1, \downarrow C_2$

sub effect $\rightarrow \downarrow C_1, \uparrow C_2$

So $C_1 \downarrow$ since both I's work in same direction.



Answers to 1c, i and k

$$3a) \quad 2000(1.21) + 1100 = (1.21)C_1 + C_2$$

$$2420 + 1100 = 1.21C_1 + C_2$$

$$3520 = 1.21C_1 + C_2$$

b) Since $U = \min\{C_1, C_2\}$ he always max his utility by consuming equal amounts of C_1 & C_2 given his BC.

$$\text{So rewrite BC as } 3520 = 2.21C_1$$

$$C_1 = 1592 = C_2$$

He saves $2000 - 1592 = 408$.

c) Price of bread in period 2 = $\frac{1.1}{1.21}$ ← new price due to inflation

$$= .91 \text{ in present value}$$

d) $2000(1.21) + 1100(1.1) = 1.21C_1 + 1.1C_2$ (FV)

$$2000 + 1100 \frac{(1.1)}{1.21} = C_1 + \frac{1.1}{1.21} C_2$$
 (PV)
$$3000 = C_1 + .91C_2$$

→ Note: this is the same as

$$\frac{2000(1.21)}{1.1} + 1100 = \frac{1.21}{1.1} C_1 + C_2$$

$$4a) \quad 16 \cdot 4 = C + 4L$$

$$64 = C + 4L$$

$$4(16 - L) = C$$

b) Use fact that $MRS = \frac{P_L}{P_C}$ and $64 = C + 4L$

$$\frac{64 + C - 2L}{L} = 4$$

$$64 + C - 2L = 4L$$

$$64 + C = 6L$$

$$C = 6L - 64$$

now $64 = (6L - 64) + 4L$

$$128 = 10L$$

$$L = 12.8$$

$$C = 12.8$$

c) wage tax at .5 \Rightarrow new wage = 2

$$\text{so } MRS = 2 = \frac{64 + C - 2L}{L}$$

$$2L = 64 + C - 2L$$

$$4L - 64 = C$$

Budget Constraint $32 = C + 2L$

$$32 = (4L - 64) + 2L$$

$$96 = 6L$$

$$L = 16$$

Since $L \uparrow$ from 12.8 \Rightarrow 16 Hours of work must fall.

5 a)

Q	MC
0	-
1	60
2	30
3	50
4	80
5	100

b) 60 (TC when $Q = 0$)

c) ~~180 - 60/3~~ ~~120/3~~ $(180 - 60/3) = 120/3 = 40$

d) when $P = 80$ $\frac{1}{3}$ $MC = 80$ $Q = 4$

$$\pi = 80(4) - 260 = 320 - 260 = 60$$

e) $P = MC = 30$ when $Q = 2$

$$\pi = 30(2) - 130 < 0 \quad \text{so no } \pi$$

Should firm stay open or shut down?

$$P = 30 \quad AVC = 35$$

since $P < AVC$ should shut down.