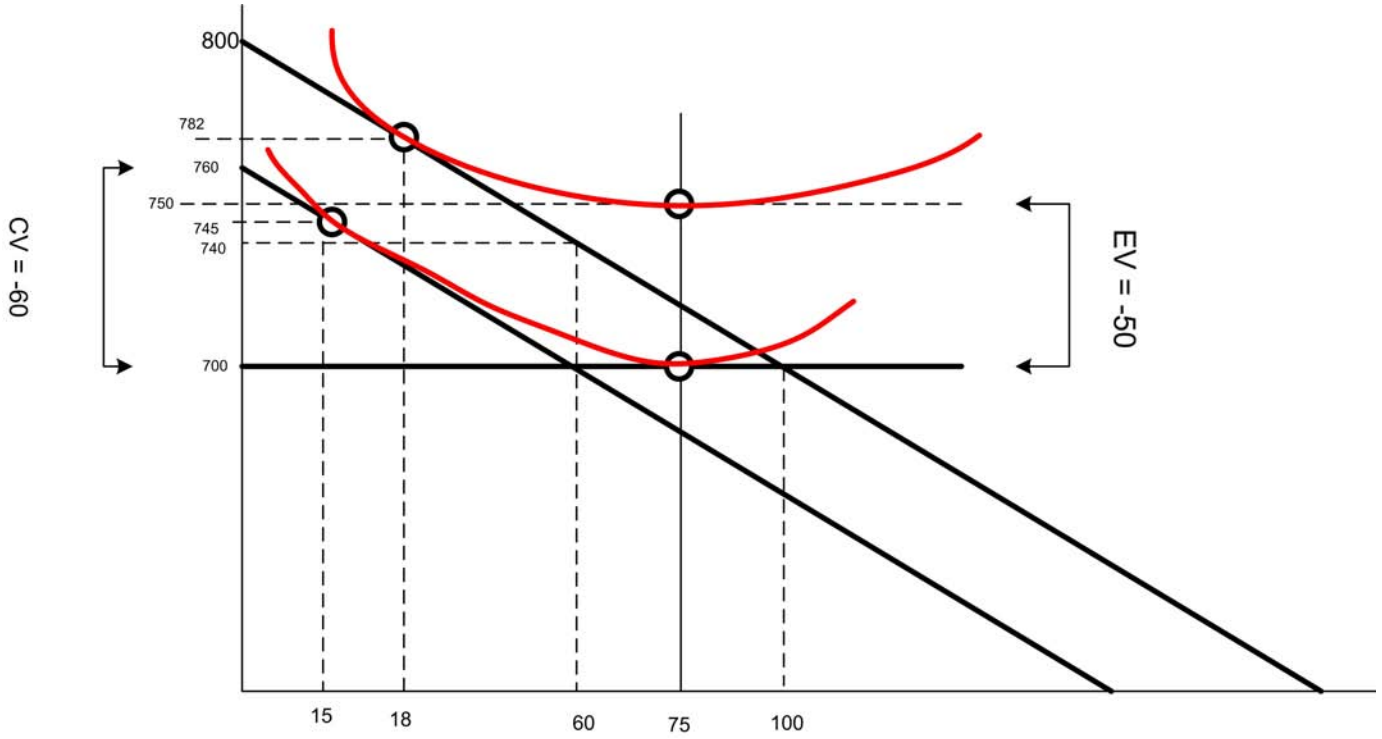
ECON 460 Winter 2012
Assignment 2: CV-EV handout KEY

1. Myrtle has $200 per month to spend on Transit (X) and all other goods (Y). She currently buys a bus pass for $50 and rides 75 times per month.If she didn't buy the pass, bus rides would cost $2/ride. Myrtle is offered to join a Transit program that would allow her to pay a membership fee and then could ride the bus for $1 per trip. The most Myrtle would pay for the membership is $20. and then she would ride 15 times a month. If she were given the membership for free, she would ride the bus 18 times per month. Myrtle also reveals that she would be indifferent between a free membership (and $1 per ride) versus simply having the traditional bus pass reduced to $25 per month (flat rate), where she would again choose to ride the bus 75 times a month.

   (a) Using all the information provided, draw all the relevant budget constraints and indifference curves. Be sure to label all equilibrium points and have a legend that explains each point (in one or two sentences).

   (b) Calculate her CV

   (c) Calculate her EV
   Graph for CV-EV



2. Skippy has the following utility function: $u = x^{1/3}y^{2/3}$ and faces the budget constraint: $M = p_x x + p_y y$.

(a) Find Skippy's demand functions, indirect utility and expenditure.

$$x = \frac{M}{3p_x}, y = \frac{2M}{3p_y}$$

indirect utility function is

$$U_i = \left(\frac{M}{3p_x}\right)^{1/3}\left(\frac{2M}{3p_y}\right)^{2/3} = \frac{2^{2/3}M}{4p_x^{1/3}p_y^{2/3}}$$

U_i tells you the utility number for any given budget and prices. The Expenditure Function is

$$\begin{aligned} E &= \frac{3p_x^{1/3}p_y^{2/3}}{2^{2/3}} \cdot U_i \qquad i = old, new \\ E &= 1.89p_x^{1/3}p_y^{2/3}U_i \end{aligned}$$

(b) Suppose $M = 120$, $P_y = 1$ and $P_x = 4$. What is Skippy's optimal x, y and utility number? If the price of x was lowered to 2 what would be her x, y and utility number

$$\begin{aligned} x_{old} &= 10, y_{old} = 80, u_{old} = 40 \\ x_{new} &= 20, y_{new} = 80, u_{new} = 50.4 \end{aligned}$$

(c) What is the most Skippy would pay to have P_x lowered to 2? **USE EXPENDITURE FUNCTION** with new p_x and old utility

$$\begin{aligned} E &= 1.89p_x^{1/3}p_y^{2/3}U_i \\ E &= 1.89p_x^{1/3}U_i \qquad (p_y = 1) \\ U_{i=old} &= 40, \qquad p_x = 2 \\ CV &= 120 - E \\ CV &= 120 - 1.89(2)^{1/3}(40) = 24.74 \end{aligned}$$

(d) Suppose $M = 120$, $P_y = 1$ and $P_x = 4$. How much additional income would Skippy need to be as well off as if the price of x had fallen to 2? **USE EXPENDITURE FUNCTION** with old p_x and new utility

$$\begin{aligned} E &= 1.89p_x^{1/3}p_y^{2/3}U_i \\ E &= 1.89p_x^{1/3}U_i \qquad (p_y = 1) \\ U_{i=new} &= 50.4, \qquad p_x = 4 \\ EV &= E - 120 \\ EV &= 1.89(4)^{1/3}(50.4) - 120 = 31.2 \end{aligned}$$

	Millions	
CS (Benefit)	$8.16	Benefit
VC Plant	$1.70	
FC Plant	$13.00	
interest	5%	
Ban costs/yr	$7.00	

Comparison

	5yr	10yr
Ban minus Plant	**$8.23**	**-$13.68**
Cells C5 - J17 or J22		

Option 1 **Pesticide Ban**

(CS-Ban)/r = **$ 23.20**

Option 2 **Treatment Plant**

Year	Benefit	Cost	Net Benefit	Disc NB	SUM NPV
0	$0.00	$13.00	-$13.00	-$13.00	-$13.00
1	$8.16	$1.70	$6.46	$6.15	-$6.85
2	$8.16	$1.70	$6.46	$5.86	-$0.99
3	$8.16	$1.70	$6.46	$5.58	$4.59
4	$8.16	$1.70	$6.46	$5.31	$9.91
5	$8.16	$1.70	$6.46	$5.06	**$14.97**
6	$8.16	$1.70	$6.46	$4.82	$19.79
7	$8.16	$1.70	$6.46	$4.59	$24.38
8	$8.16	$1.70	$6.46	$4.37	$28.75
9	$8.16	$1.70	$6.46	$4.16	$32.92
10	$8.16	$1.70	$6.46	$3.97	**$36.88**
11	$8.16	$1.70	$6.46	$3.78	$40.66
12	$8.16	$1.70	$6.46	$3.60	$44.26
13	$8.16	$1.70	$6.46	$3.43	$47.68
14	$8.16	$1.70	$6.46	$3.26	$50.95
15	$8.16	$1.70	$6.46	$3.11	$54.05

From CS page ***$8,160,000***

or, in millions: ***$8.16***

Question 2

Ban > 5 yr plant by **$8.23** million

Question 3

10 yr Plant > Ban **$13.68** million

Question 4

Ban = 5 yr plant if r = **10.21%**

Question 5

Ban = 10 yr plant if r = **38.90%**