

**EC 151 Homework V**  
**Education & Local Political Economy**  
**Solutions**  
**Due November 11th in class**

**1) Education**

Consider a utility function defined in terms of consumption  $c$  and child education  $e$ . Assume that the child's time endowment  $t$  can be divided between education  $e$  and labor  $l$  and that the child receives a wage  $w$  for each unit of time worked. Household income other than that generated by the child is  $y$  and the cost of the consumption good is  $p_c$  and the cost per unit time of school is  $p_e$ .

- a) Write down a budget constraint that depends on the choices  $c$  and  $e$ , but not on  $l$ .
- b) Assume that the utility function for the household is  $\ln(e)+c$
- c) Find an expression for child education as a function of income, prices, and wages (Hint solve your budget constraint from a and substitute into your utility function and then maximize with respect to  $e$ ). If your calculus is rusty, please answer this question intuitively. For example, how do you think child education depend on each of the variables and why?
- d) Is education increasing or decreasing in the child wage?
- e) In class we saw that an increase in the child wage could either be positive or negative. In light of this, explain why your answer in (d) is not ambiguous.

**2) Local Political Economy**

True or False. State your assumptions and provide reasons.

- a) The finding that reservations for women candidates results in a different expenditures on public goods than arises without reservations is consistent with the pure mean/median voter model of governance as discussed in class.

**False**—in the mean vote model politicians can commit to policies so the identity of the politician should not matter

- b) Based on the model discussed in class an increase in the fraction of landless households for given total population and land is likely to decrease the wage and also result in an increased expenditure on roads in the presence of democracy.

**False**—wage stays fixed but expenditure on roads increases

# 1) Education

BUDGET CONSTRAINT: (BC)

$$p_c c + p_e e = \gamma + w l.$$

$$t = e + l. \Rightarrow l = t - e$$

$$\Rightarrow \boxed{p_c c + p_e e = \frac{\gamma}{y} (t - e) + \dots}$$

UTILITY FUNCTION IS OF FORM :

$$u(c, e) = \ln(e) + c$$

"Quasi-linear" utility!

Maximization Problem:

wrk  $\max_{c, e} u(c, e)$  subject to  $p_c c + p_e e = \gamma + w(t - e)$

$$\max_{c, e} \ln(e) + c \quad \text{sub. to } p_c c + p_e e = \gamma + w(t - e)$$

First, Rearrange BC to get value for c in terms of e

$$c = \frac{\gamma + w t - e(p_e + w)}{p_c}$$

substitute above into utility function

$$u(c, e) = \ln(e) + \frac{\gamma + w t - e(p_e + w)}{p_c} = u(e)$$

Now maximize by taking  $\frac{du(e)}{de}$  and setting equal to 0

~~$$\frac{du(e)}{de} = \frac{1}{e} - \frac{p_e + w}{p_c} = 0$$~~

~~$$e^* = \frac{p_c}{p_e + w}$$~~

$$\frac{1}{e} - \frac{p_e + w}{p_c} = 0$$

$$\frac{1}{e} = \frac{p_e + w}{p_c}$$

$$e^* = \frac{p_c}{p_e + w}$$

$$c^* = \frac{y + wt}{p_c} - 1$$

As  $w \uparrow$ ,  $e^* \downarrow$

There is no income effect, only sub. effect.  
(special property of a quasilinear utility fn).

Say we had non-quasilinear  
 $U(c, e) = \ln(e) + \ln(c)$

Now 
$$e^* = \frac{y + wt}{2(p_e + w)}$$

As  $w \uparrow$ ,  $e^*$  can go both ways.