I. Labor supply effects of a no exemption NIT plan (R = 0)

A. Program parameters: $G, t, Y_e = \frac{G}{t}$

1. $NIT = G - tY$ for $Y \le Y_e$

2. New budget line:

$$\begin{aligned} Y &= NIT + wh + I \\ &= G - t(wh + I) + wh + I \\ &= G + (1-t)(wh + I) \\ &= G + (1-t)I + (1-t)wh \end{aligned}$$

3. Break-even hours of work at wage w: $h_e = \frac{Y_e - I}{w}$

4. Changes in nonlabor income and wages for someone on the program

a. $\Delta I = G + (1-t)I - I$ or

$$\boxed{\Delta I = G - tI}$$

b. $\Delta w = (1-t)w - w$ or

$$\boxed{\Delta w = -tw}$$

5. Approximate change in hours of work for someone who opts for the program.

a. The ordinary (uncompensated) labor supply function: $h = h(w, I)$

b. The change in hours is given by

$$\begin{aligned} dh &= \frac{\partial h}{\partial w} dw + \frac{\partial h}{\partial I} dI \\ &= -tw \frac{\partial h}{\partial w} + (G - tI) \frac{\partial h}{\partial I}, \quad \text{for } dw = -tw \text{ and } dI = G - tI \\ &= -tw\left[S + h_0 \frac{\partial h}{\partial I}\right] + (G - tI) \frac{\partial h}{\partial I} \quad \left(\text{since } \frac{\partial h}{\partial w} = S + h_0 \frac{\partial h}{\partial I}\right) \\ &= -twS - twh_0 \frac{\partial h}{\partial I} + (G - tI) \frac{\partial h}{\partial I} \end{aligned}$$

where $-twS$ = the substitution effect of the wage change,

$-twh_0 \frac{\partial h}{\partial I}$ = the income effect of the wage change, and

$(G - tI) \frac{\partial h}{\partial I}$ = the pure income effect of the program.

c. Let h_0 and h_1 represent labor supply before and after the program, respectively.

(1) If the individual does not opt for the program, set $dh = 0$ so that $h_1 = h_0$.

(2) If the individual opts for the program

and $dh + h_0 \geq T$, set $h_1 = T$;

or if $dh + h_0 \leq 0$, set $h_1 = 0$;

otherwise $h_1 = dh + h_0$.

6. Discrete or actual change in hours of work for someone who opts for the program.

a. $h_0 = h(W,I)$ and $\tilde{h} = h((1-t)w, G+(1-t)I)$.

b. $\Delta h = \tilde{h} - h_0$
$= h((1-t)w, G+(1-t)I) - h(w,I)$.

(1) If the individual does not opt for the program,

$\Delta h = 0$ and $h_1 = h_0$.

(2) If the individual opts for the program

and $\tilde{h} \geq T$, set $h_1 = T$;

or if $\tilde{h} \leq 0$, set $h_1 = 0$;

otherwise $h_1 = \tilde{h}$.

7. Computation of income changes for one who opts for the program.

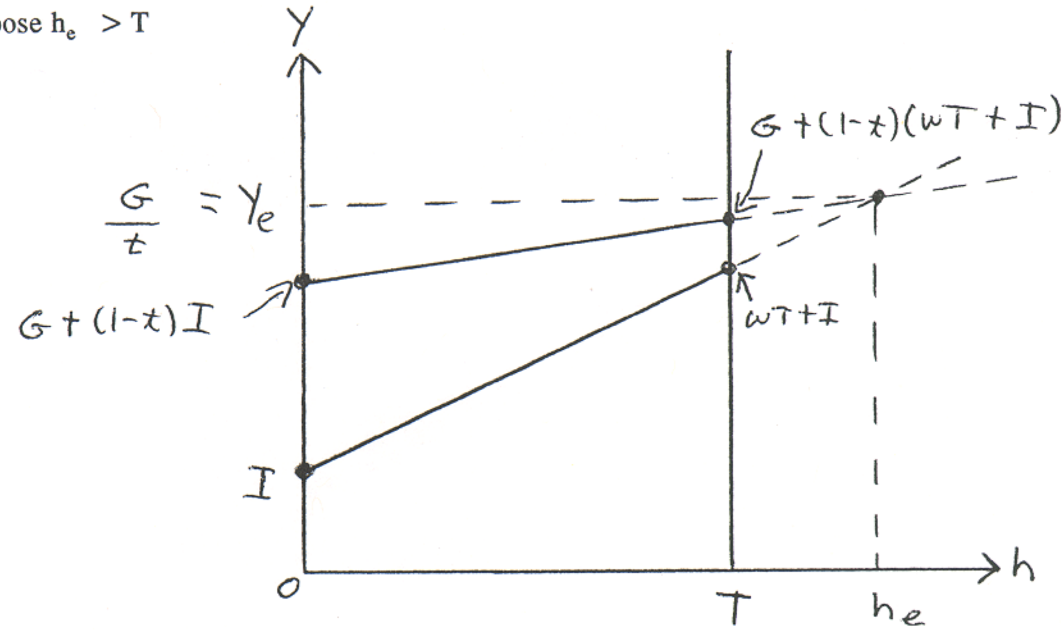
a. $\Delta Y = Y_1 - Y_0$,

where $Y_1 = G + (1-t)(wh_1 + I)$ (after)

and $Y_0 = wh_0 + I$ (before).

b. $NIT = G - t(wh_1 + I)$.

B. Suppose $h_e > T$

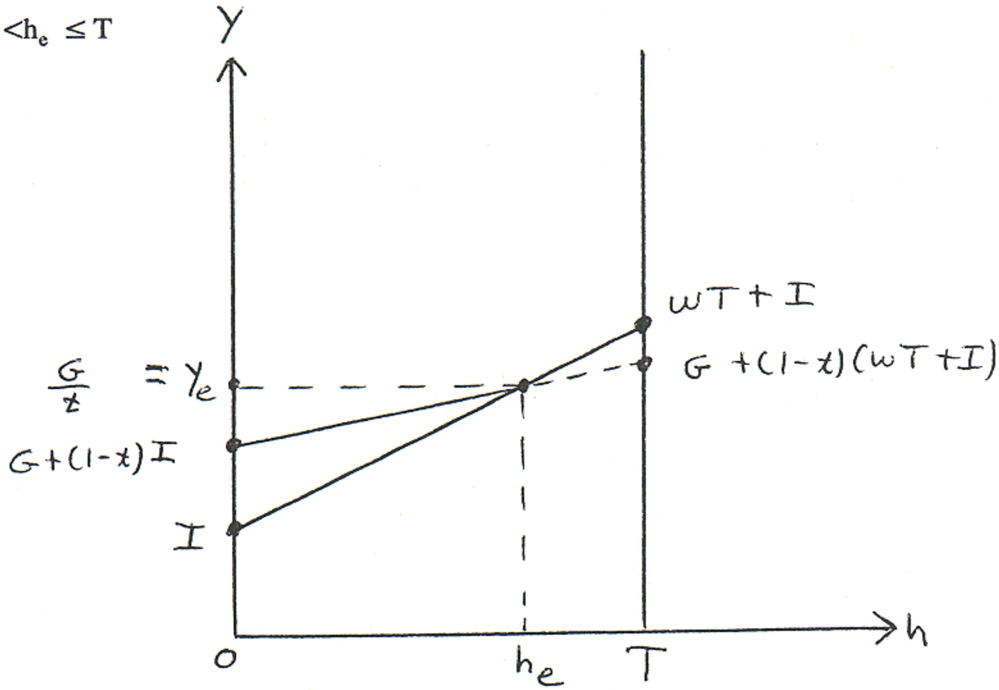


1. The individual would definitely opt for the program.

2. $Y_e = \frac{G}{t} > wT + I$

3. $G + (1\text{-}t)I > I$ and $G + (1\text{-}t)(wT + I) > wT + I$

C. Suppose $0 < h_e \leq T$



1. $0 < h_0 < h_e$

   a. The individual would definitely opt for the program.

   b. Hours of work greater than h_e could have been selected before and were not, therefore the individual would be better off somewhere along the new budget line up to h_e.

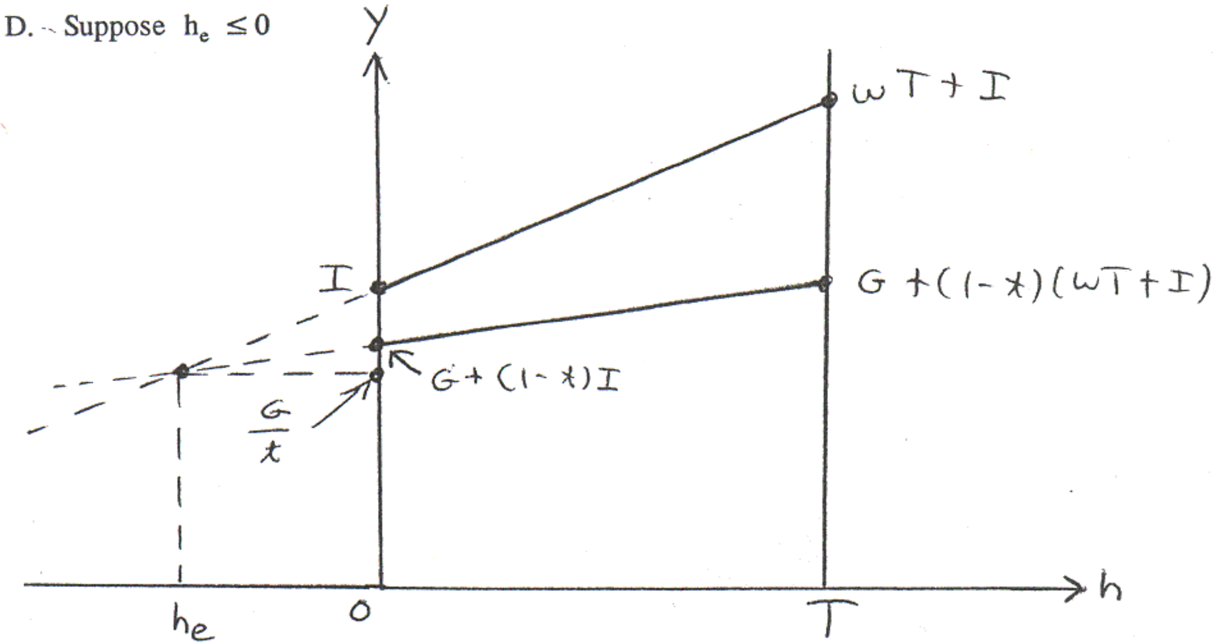
2. Suppose $h_e \leq h_0 \leq T$

   a. One cannot tell whether or not the individual will opt for the program without knowledge of the individual's utility function.

   b. If $U(Y_0, h_0) \geq U(Y_1, h_1)$, then the individual would *not* opt for the program.

   c. If $U(Y_0, h_0) < U(Y_1, h_1)$, then the individual would opt for the program.

D. -- Suppose $h_e \leq 0$



1. The individual will *not* opt for the program.

2. $G + (1\text{-}t)I \leq T.$

3. $Y_e = \dfrac{G}{t} \leq I.$

Numerical Example of the NIT Impact on Labor Supply

Let $G = \$4800/\text{yr}$, $t = \frac{1}{2}$, $R = 0$, then $Y_e = \frac{G}{t} = \frac{\$4800}{\frac{1}{2}} = \$9600/\text{yr}$.

If $Y < 9600$, then

$$NIT = 4800 - \tfrac{1}{2}Y, \text{ and}$$

$$Y_T = 4800 + \tfrac{1}{2}Y.$$

Consider the case of an individual with the following circumstances:

$w = \$4.00/\text{hr}$, $h_0 = 2000$ hrs./yr, and $I = 0$.

Therefore $Y = 4h \Rightarrow Y_0 = (4)(2000) = \$8000$

$$h_e = \frac{Y_e - I}{w}$$

$$= \frac{9600 - 0}{4}$$

$$= 2400 \text{ hrs/yr.}$$

Since $h_0 = 2000 < 2400$, the individual would definitely opt for the program.

$$\Delta I = G + (1-t)I - I$$

$$= G - tI$$

$$= 4800 - \left(\tfrac{1}{2}\right)(0)$$

$$\boxed{\Delta I = \$4800}$$

$$\Delta w = -tw$$

$$= -\left(\tfrac{1}{2}\right)(4)$$

$$\boxed{\Delta w = -\$2}$$

Suppose the labor supply function is given by the following Ashenfelter-Heckman type:

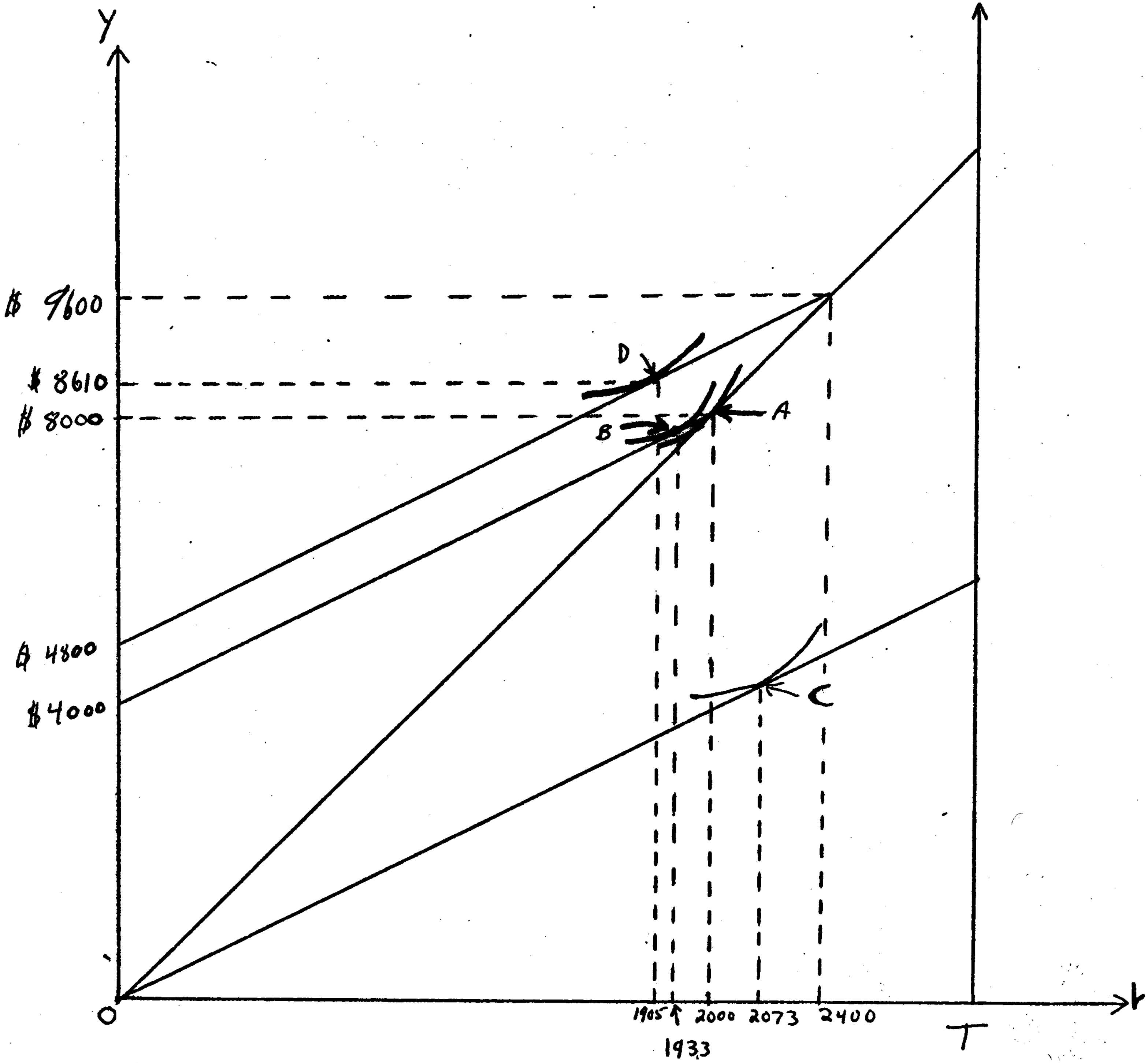
$$\Delta h = 33.5\,\Delta w - 0.035(h^{*}\,\Delta w + \Delta I)$$

$$= 33.5\,\Delta w - 0.035\,h^{*}\,\Delta w - 0.035\,\Delta I$$

$$= (33.5)(-2) - (0.035)(2000)(-2) - (0.035)(4800) \quad (\text{letting } h^{*} = h_0 = 2000)$$

$$= \underset{(\text{S.E. of } \Delta w)}{-67} + \underset{(\text{I.E. of } \Delta w)}{140} - \underset{(\text{pure I.E. of } \Delta I)}{168}$$

$$\boxed{\Delta h = -95 \text{ hrs}}$$



Y
$ 9600
$ 8610
$ 8000
$ 4800
$ 4000
D
A
B
C
O
1905
2000
2073
2400
1933
T