ECON W3213 Spring 2014 Jón Steinsson

Answer to Question on Labor Supply and Taxes

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1 Question

Derivation of:

$$\frac{V'(H)}{U'(C)} = w\frac{1-\tau_l}{1+\tau_c}$$

From **Lecture Notes 4**

2 Answer

We have a utility function

$$U(C) - V(H)$$

The budget constraint (without taxes) used to be this

$$C = wH$$

However, with taxes, the amount of money we spend on consumption is however much we buy C plus the consumption tax on the amount that we bought $\tau_c C$. That makes the new LHS $(1+\tau_c)C$

The still get wH as income, but we get $\tau_l wH$ taxed away. Our disposable income then becomes $(1-\tau_l)wH$

Then our new budget constraint (with taxes) is

$$(1+\tau_c)C = (1-\tau_l)wH$$

Rearranging,

$$C = wH\frac{1+\tau_c}{1-\tau_l}$$

Substituting back into the original utility function (since that's how we solve constrained optimization without using Lagrangians), the utility function becomes

$$U\left(wH\frac{1+\tau_c}{1-\tau_l}\right) - V(H)$$

Differentiating with respect to H and setting to 0, we get

$$\begin{aligned}
\left(w\frac{1+\tau_c}{1-\tau_l}\right)U'\left(wH\frac{1+\tau_c}{1-\tau_l}\right) - V'(H) = 0 \\
\left(w\frac{1+\tau_c}{1-\tau_l}\right)U'(C) - V'(H) = 0 \\
\frac{V'(H)}{U'(C)} = w\frac{1-\tau_l}{1+\tau_c}
\end{aligned}$$

We have established a relationship, just like we did with the non-tax case, between H and w. This shows how much number of hours worked H will change if we vary w. This is then our **labor supply post taxes**

Jón then proceeded to use a specific utility function

$$\log C - \psi\frac{H^{1+\eta}}{1+\eta}$$