Consumption Time in Household Production: Implications for the Goods-Time Elasticity of Substitution

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Q: How does consumption time affect the elasticity of substitution (*EOS*) between goods and time?

A: Consumption time <u>decreases</u> the *EOS* between goods and time.

Setting

- Meal Production in the home
  - Two possible definitions of a "meal"
    - "Eating occasion" (includes the consumption time)
    - "Meal production" (excludes the consumption time)
- Two inputs: goods (food items) and time (labor)

Analytical Result

The difference in the "eating" and "meal production" goods-time *EOS* is shown to depend on the difference in the elasticity of time in food production with respect to the wage rate ($\eta_{tf} < 0$) and the elasticity of time in food consumption with respect to the wage rate ($\eta_{tc} < 0$). Specifically, the goods-time *EOS* **without** consumption time is

$$\sigma_f=\partial \ln(x_f/t_f) / \partial \ln w = \partial \ln x_f / \partial \ln w - \partial \ln t_f / \partial \ln w = \eta_{xf} - \eta_{tf} \quad (1)$$

and the goods-time *EOS* **with** consumption time is

$$\sigma_e=\partial \ln(x_f/(t_f+t_c)) / \partial \ln w = \partial \ln x_f / \partial \ln w - \partial \ln (t_f+t_c) / \partial \ln w = \eta_{xf} - [s_f\eta_{tf}+s_c\eta_{tc}] \quad (2)$$

where x_f = expenditure on food; t_f = time in home meal production; t_c = time in meal consumption; w = wage rate; and $s_i = t_i/(t_f + t_c)$ for $i=f, c$;

Subtracting (2) from (1) and a little algebra yields the difference:

$$\boldsymbol{\sigma_f-\sigma_e=s_c(\eta_{tc}-\eta_{tf})}$$

So, if the production time is more elastic than the consumption time with respect to the wage rate ($|\eta_{tc}| < |\eta_{tf}|$) then the goods-time *EOS* in "meal production" will be greater than that in "eating".

Empirical Result

- Using an approach similar to Hamermesh (2008), we provide an empirical example with the American Time Use Survey (ATUS) data for 2005-2008 matched to the Current Population Survey (CPS) Food Security Supplements (FSS)
- Hamermesh (2008) found the *EOS to be* about 0.22 to 0.33 in "eating". Our results suggests <u>more</u> substitutability if the focus is just "meal production "
- Goods-time *EOS* in "meal production" is about 60% <u>greater</u> than in "eating"

Elasticity of Substitution	Reference- week Food Expenditure	Usual Food Expenditure
With consumption time	0.28 (0.13)	0.31 (0.11)
Without consumption time	0.48 (0.16)	0.49 (0.15)
(N=1872)		

Conclusion

The goods-time *EOS* is <u>greater</u> than originally thought when we exclude the consumption time from the household production .

Reference

Hamermesh, D. S. (2008). "Direct Estimates of Household Production."*Economics Letters*. Vol. 98:31-34.