Why Should We Care?

- Half of the labor economics
  - maybe more, labor demand is less studied
- Relates to how should we tax

Overview of Literature

- Labor supply elasticity for men
  - A vast finding of small numbers
- Labor supply elasticity for women
  - A different story with higher estimates
  - But more difficult since participation choice kicks in

Basic Static Model

$$U_t = \frac{C_t^{1+\eta}}{1+\eta} - \beta_t \frac{h_t^{1+\gamma}}{1+\gamma}$$
$$s.t. \quad C_t = w_t(1-\tau)h_t + N_t$$

- One chooses C_t (consumption) and h_t (hour of work)
- $\eta \leqslant 0$: parameter (for income effects)
- $\gamma \geqslant 0$: parameter (for substitution effects)
- β_t: preference for leisure
- w_t: wage, τ: tax rate, N_t: non-labor income

Basic Static Model

$$U_t = \frac{C_t^{1+\eta}}{1+\eta} - \beta_t \frac{h_t^{1+\gamma}}{1+\gamma}$$
$$s.t. \quad C_t = w_t(1-\tau)h_t + N_t$$

- This is the famous CRRA form (Constant Relative Risk Averse)
- Not very popular in static models, but provides links to dynamic
- Note how to link back to our Roy model and potential outcome
- Consumption is usually not observed, so replace w/ b.c. empirically

Basic Static Model

Optimality condition

$$\text{MRS} = \frac{\text{MUL}}{\text{MUC}} = \frac{\beta_t h_t^{\gamma}}{[w_t(1-\tau)h_t + N_t]^{\eta}} = w_t(1-\tau)$$

- You should be familiar with this
- Under this, no closed form for h_t

Basic Static Model

$$\epsilon_w = \frac{\partial \log h_t}{\partial \log w_t}\Big|_{N_t} = \frac{1+\eta S}{\gamma - \eta S}$$

$$\epsilon_I = \frac{\partial \log h_t}{\partial \log N_t}\Big|_{w_t} = \frac{\eta}{\gamma - \eta S}(1-S)$$

$$S = \frac{w_t(1-\tau)h_t}{w_t(1-\tau)h_t + N_t}$$

- If N_t small, then we have simpler elasticities
- ϵ_w could still be of any sign

Basic Static Model

$$\log h_t = \frac{1+\eta}{\gamma-\eta}\log w_t(1-\tau) - \frac{1}{\gamma-\eta}\log \beta_t$$

- A special case where we could get the labor supply equation
- Recall the OLS regression we always run, what's the "endogeneity" issue?
- Do we always see w_t?

Basic Dynamic Model

$$V = U_1 + \rho U2$$
$$C_1 = w_1(1 - \tau_1)h_1 + N_1 + b$$
$$C_2 = w_2(1 - \tau_2)h_2 + N_2 - b(1 + r)$$

- ρ is the discount rate
- b is net borrowing

Basic Dynamic Model

With FOC $\frac{\partial V}{\partial h_1}$, $\frac{\partial V}{\partial h_2}$, and $\frac{\partial V}{\partial}$, we derive the following:

$$\log \frac{h_2}{h_1} = \frac{1}{\gamma}\{\log \frac{w_2}{w_1} + \log \frac{1-\tau_2}{1-\tau_1} - \log \rho(1+r) - \log \frac{\beta_2}{\beta_1}\}$$

Frisch elasticity:
the rate at which a worker shifts hours of work from period 1 to period 2 as the relative wage increases in period 2

$$\frac{\partial \log(h_2/h_1)}{\partial \log(w_2/w_1)} = \frac{1}{\gamma}$$

The Elasticities

- Marshallian (Uncompensated): Hold N_t constant
- Hicksian (Compensated): Hold utility constant
- Frisch: Hold marginal utility of wealth constant (Lagrange multiplier)
- Marshallian $<$ Hicksian $<$ Frisch
- Note that there are also intensive/extensive distinction

Overview of Econometric Issues

- Note that all the models could be put in the Roy model framework
- The usual "OLS" or "Reduced Form" estimation can be seen from here
- Generally, think hard about how "endogeneity" can arise from your model

Basic Static Model

- One obvious: $Cov(\beta_t, w_t)$
- The other: simultaneous equation. Why w_t shifts?
- Back to Roy model, w is the D there.
- All the tools we learned apply.

Empirical Findings

- Various instruments, LATE, ...
- Very different setups

TABLE 6
SUMMARY OF ELASTICITY ESTIMATES FOR MALES

Authors of study	Year	Marshall	Hicks	Frisch
Static models				
Kosters	1969	−0.09	0.05	
Ashenfelter-Heckman	1973	−0.16	0.11	
Boskin	1973	−0.07	0.10	
Hall	1973	n/a	0.45	
Eight British studies[a]	1976–83	−0.16	0.13	
Eight NIT studies[a]	1977–84	0.03	0.13	
Burtless-Hausman	1978	0.00	0.07–0.13	
Wales-Woodland	1979	0.14	0.84	
Hausman	1981	0.00	0.74	
Blomquist	1983	0.08	0.11	
Blomquist-Hansson-Busewitz	1990	0.12	0.13	
MaCurdy-Green-Paarsch	1990	0.00	0.07	
Triest	1990	0.05	0.05	
Van Soest-Woittiez-Kapteyn	1990	0.19	0.28	
Ecklof-Sacklen	2000	0.05	0.27	
Blomquist-Ecklof-Newey	2001	0.08	0.09	
Dynamic models				
MaCurdy	1981	0.08[b]		0.15
MaCurdy	1983	0.70	1.22	6.25
Browning-Deaton-Irish	1985			0.09
Blundell-Walker	1986	−0.07	0.02	0.03
Altonji[c]	1986	−0.24	0.11	0.17
Altonji[d]	1986			0.31
Altug-Miller	1990			0.14
Angrist	1991			0.63
Ziliak-Kniesner	1999	0.12	0.13	0.16
Pistaferri	2003	0.51[b]		0.70
Imai-Keane	2004	0.40[e]	1.32[e]	0.30–2.75[f]
Ziliak-Kniesner	2005	−0.47	0.33	0.54
Aaronson-French	2009			0.16–0.61
Average		0.06	0.31	0.85

Notes: Where ranges are reported, mid-point is used to take means.
[a] = Average of the studies surveyed by Pencavel (1986).
[b] = Effect of surprise permanent wage increase.
[c] = Using MaCurdy Method #1.
[d] = Using first difference hours equation.
[e] = Approximation of responses to permanent wage increase based on model simulation.
[f] = Age range.

TABLE 7
SUMMARY OF ELASTICITY ESTIMATES FOR WOMEN

Authors of study	Year	Marshall	Hicks	Frisch	Uncompensated (dynamic)	Tax response
Static, life-cycle and life-cycle consistent models						
Cogan	1981	0.89[a]				
Heckman-MaCurdy	1982			2.35		
Blundell-Walker	1986	−0.20	0.01	0.03		
Blundell-Duncan-Meghir	1998	0.17	0.20			
Kimmel-Kniesner	1998			3.05[b]		
Moffitt	1984				1.25	
Dynamic structural models						
Eckstein-Wolpin	1989				5.0	
Van der Klauuw	1996				3.6	
Francesconi	2002				5.6	
Keane-Wolpin	2010				2.8	
Difference-in-difference methods						
Eissa	1995, 1996a					0.77–1.60[b]

Notes:
[a] = Elasticity conditional on positive work hours.
[b] = Sum of elasticities on extensive and intensive margins.

Consensus

- Very small (if positive) labor supply elasticity
- Why?
- Maybe hard to adjust the hours supplied?
- Or behavioral reasons?

Taxi Driver Literature

- Camerer et al.(1997) "Estimated wage elasticities are significantly negative in two out of three samples."
- Farber Henry S., Taxi (JPE 2005, QJE 2015)
- Gerald Oettinger, Stadium Vendors (JPE 1999)
- Fehr and Goette, Messenger (AER 2007)
- Crawford and Meng, NYC Taxi (AER 2011)

Farber

- "I have had informal conversations with cab drivers in New York City and elsewhere when traveling for the past few years.
- My impression from these interviews taken together is that drivers do not consciously behave as though they are target earners.
- The reasoning they articulate is consistent with a standard neoclassical model with small daily income effects."