Economics 14.661 J. Angrist
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Key Ideas #3
Life-Cycle Labor Supply: Models and 'Metrics

I. Theory

- Life-cycle labor supply models adapt the LCH/PIH to the life-cycle allocation of *time* as well as consumption.
- Key assumptions in the traditional setup: perfect capital markets, parametric wages and prices, intertemporally additive preferences, perfect certainty or expected utility maximization under uncertainty.
- Key theoretical implications: labor supply (and consumption) can be written as a function of contemporaneous wages and prices plus (either) the time-invariant marginal utility of wealth under certainty or the expected MU(wealth) plus unpredictable wealth shocks under uncertainty.
- The *intertemporal substitution elasticity* (ISE) measures the response of hours worked to a change in wages holding MU(wealth) fixed. A little loosely, I think of this as "holding wealth fixed" (Card 1994 sensibly discusses "wealth shocks" rather than "MU shocks".) The slippage here comes from the fact that in some models, we can reallocate earnings over time, changing MU(wealth) with lifetime wealth (PDV) held fixed.
- *The ISE is a many-splendored thing:*
    - *The largest theoretical labor supply elasticity; an upper bound for elasticity optimists.*
    - *The ISE captures the response to anticipated life-cycle wage changes, like higher pay with more experience.*
    - *The ISE approximates the response to wage shocks too small to have significant wealth effects*
- Labor supply scholars contrast the *target earning hypothesis* with the ISH. Target earning behavior can be explained by negative within-period income/wealth effects, effects too large to be compatible with the LCH/PIH framework.

II. 'Metrics

- ANCOVA (fixed effects or deviations-from-means) kills the unobserved but fixed MU(wealth) term in a Heckman-MaCurdy LCLS model under certainty. Messy 'metrics matters abound: MU(wealth) may not be fixed; wages are poorly measured and differencing/devs-from-means aggravates bias from measurement error; wages are often measured as average hourly earnings, a quantity that's almost surely negatively correlated with hours worked if hours are mismeasured (this is called *division bias*).

- The LCLS model implies that average (log) hours and average (log) wages lie on an aggregate labor supply curve. In the absence of aggregate wealth shocks or other aggregate supply shifts, the correlation between average hours and average wages can be interpreted as an ISE. The details vary with the utility function, but this generally has an IV interpretation: instrumental variables for wages in an individual LCLS labor-supply function are time dummies.

- Grouped-data (IV) estimation of the ISE mitigates measurement error problems.

III. Evidence, debates

- Microeconometric ISE estimates for prime-age males computed in survey data are usually small, though positive (e.g., MaCurdy 1981, <.3). These models are poorly identified (noted by Devereux 2007).
- Angrist (1990, 1991) argues that the simple LCLS models fits average hours and wages surprisingly well. Card (1994) wonders whether the ISE is relevant for cyclical fluctuations in hours: can we really ignore wealth effects?
- Modern labor-supply research looks for natural and laboratory experiments that can be used to measure elasticities, seeking to distinguish intertemporal substitution from target earning, and trying to understand why workers seem to have a strong preference (and are willing to pay) for immediate payouts.
- Estimates for specific occupations with flexible hours are larger (stadium vendors, bicycle messengers, cab drivers, fisherman, gig-economy workers). Identification here is usually more credible.

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