Labor Economics Problem Set 1

1. Unemployment rates for college graduates tend to be less cyclical than unemployment rates for less educated workers. Suppose you're interested in the behavior of the unemployment rate for <u>college-educated men</u> for the period 1960-2000, but unemployment rates by sex and education are published only since 1980. You also have detailed census-based unemployment rates for 1960 and 1970, as well as unemployment rates for <u>all</u> men for the entire period. Explain how to use regression to impute the missing data from the data you have. Contrast regression imputation with imputation using the Lebergott (1964) method discussed in Romer (1986). Which imputed series is likely to have higher variance and why?

2. Consider a simplified federal EITC with negative tax rate (π) for low earners (meaning a worker with wage w takes home $[1 + \pi]w$), a maximum payment, and a linear phase-out gradually reducing EITC payments when earnings exceed a cap. Suppose the EITC is applied on top of a state welfare program with an NIT-type structure, guaranteeing a payment of G at zero earnings with positive tax rate $\tau \in (0, 1)$ and a breakeven computed ignoring the EITC. Assume $\pi > \tau$, so the combination of EITC plus welfare initially boosts wages for those receiving both.

   (a) Program design is challenging: use a graph to show that if EITC payments peak before earnings hit the NIT breakeven, the combination of EITC plus NIT need not promote work for all welfare recipients. Propose a modification to the EITC that strengthens work incentives. What's the downside to this modification?

   (b) Rothstein (2010) casts a skeptical eye on the EITC as a poverty-reduction tool, preferring traditional welfare programs in the form of an NIT. Briefly explain the paper's argument using graphs that describe supply and demand among EITC-eligible and non-EITC-eligible workers (the EITC mostly covers single mothers).

   (c) This year's presidential campaign has featured discussions of child tax credits (CTCs), prompted in part by the impending expiration of pandemic-era increases to the $2000 partially-refundable CTC now in the tax code. The candidates appear to be considering something like this:

      - Vice president Kamala Harris has proposed adding a fully refundable $6,000 CTC for single parents earning up to $200,000.
      - Vice presidential candidate JD Vance has proposed a $5000 non-refundable CTC with no income cap. The Vance proposal would impose a work requirement that requires earnings of at least $2500 to qualify for the credit.

      Ignoring the existing EITC and CTC, use graphs to contrast <u>income and labor supply consequences</u> of these proposals from the point of view of single mothers with a toddler who are (1) not currently working; (2) currently working and earning slightly above $200,000.

3. This problem asks you to model labor supply in a two-earner family. Consider Mr. and Mrs. Einheitlich, who work together to maximize a family utility function that can be written:

$$U = U\left(c_1 + c_2, l_1, l_2\right). \tag{1}$$

Einheitlich spouse $i = 1, 2$ has a time endowment, T, and faces wage w_i. The Einheitlichs also share non-labor income y and face a common price p for consumption goods and a common budget constraint. Hint: background for this problem can be found in Ashenfelter and Heckman (1974).

   (a) What does (1) imply about the marginal rate of substitution between the spouses' consumption in family utility? Does this seem realistic–or merely a romantic conceit? Propose a family utility function that loosens this restriction.

   (b) Suppose each partner in the couple has their own non-labor income, y_i, so that $y = y_1 + y_2$. Suppose also that the spouses must each satisfy an *individual* budget constraint. Explain (without too much math) why the need to satisfy individual constraints typically makes the Einheitlich *family* worse off. Does this conclusion depend on the restriction embodied in (1)?

(c) Returning to a common family budget constraint and utility function (1), write the uncompensated labor supply responses to a change in own and partner wage rates in terms of substitution and income effects. Call the substitution effects S_{ij} for worker i's response to a change in family member j's wage. How does consumer theory restrict the Slutsky substitution <u>matrix</u>?

(d) Totally differentiate the labor supply functions, assuming $dp = 0$. Substitute results from (c) above to obtain

$$dh_i = S_{i1}dw_1 + S_{i2}dw_2 + B_i\left[h_1dw_1 + h_2dw_2 + dy\right],$$

where $B_i = \partial h_i/\partial y$. Use this equation and theoretical restrictions on the Slutsky matrix to show that the introduction of a negative income tax should reduce family earnings, though it need not reduce both partners' earnings. (Hints: what are the dw_i and dy induced by an NIT? Assume income effects on hours are negative.)

4. Life-cycle labor supply

(a) Derive the λ-constant labor supply and commodity demand functions for the utility function used in Heckman and MaCurdy (1980); MaCurdy (1981).

i. What preference parameter(s) determine the intertemporal substitution elasticity (ISE) in this model? Why is this ISE sure to be positive as a matter of theory?

ii. Use the model to compare the (theoretical) labor supply consequences of wage changes due to: changes in labor market experience; cyclical fluctuations in wages; a planned switch to lower-wage hourly work after retirement; an unanticipated switch to lower-wage work necessitated by job loss; pay promotions for rideshare drivers.

(b) The Angrist (1990) working paper summarized in Card (1994) uses a time series of cross sections from the Current Population Survey (CPS) to interpret fluctuations in average hours worked as a labor supply response to changing wage rates. This intertemporal substitution hypothesis originates with Lucas and Rapping (1969).

i. Construct CPS extracts with 2000-2009 data for men aged 25-50 in 2000 and 2010-2019 data for men aged 25-50 in 2010, similar to those used to compute the annual-average estimates of intertemporal substitution elasticity θ_1 in Angrist (1990) Table 2a and 2b (these are the estimates for "Sample 1"). Plot average log hours in your extract against average log wages after partialling out cohort effects (with cohort defined as age in 2000 or 2010). Construct these plots separately for the two periods and include the relevant regression lines in each.

ii. Try to find a version of the aggregate labor supply equation that passes the relevant goodness-of-fit test (compute this by doing 2SLS using dummy-variable instruments). Explore models with and without aggregate and cohort-specific time trends, as well as dummies for Great Recession years. Is there any version of the averaged λ-constant Heckman-MaCurdy labor supply equation that fits 21st Century aggregate hours data?

iii. Why does Card (1994) take a skeptical view of the large positive intertemporal substitution elasticities generated by the grouped-data estimator applied to CPS data (and PSID data in Angrist 1991)? Does evidence on the labor supply responses of bicycle messengers, taxi drivers, and Uber drivers address this/these concern(s)?