

Labor Economics Problem Set 1

1. You're interested in studying the evolution of a particular subgroup unemployment rate, u_t , for 1960-2015, but the series you're interested in is somewhat specialized and starts only in 1980. You have covariates, x_t , for the entire period. Explain how to use the covariate series to impute the missing data. Explain why the variance of the imputed series is unlikely to exceed the variance of the target series. Reconcile this fact about regression imputation with the Romer (1986) finding that the variance of Lebergott's (1964) prewar imputed unemployment series is too high.
2. Draw the EITC+NIT budget set for two scenarios, one where NIT payments are reduced by a fraction $0 < \tau < 1$ for every dollar of earnings, ignoring the EITC and one where NIT payments are reduced for every dollar of earnings *including* EITC payments.
 - (a) How does implicit taxation of the EITC by an NIT affect the EITC's (theoretical) labor supply consequences?
 - (b) Rothstein (2010) doesn't much like the EITC - what's his beef? Explain his argument using supply and demand style graphs of a covered and uncovered sector. Is there evidence in support of his concern?
3. This problem asks you to extend the standard one person static labor supply problem to a two-earner family. Consider Mr. and Mrs. Unitary, who act to maximize following family utility function:

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

The Unitary family's utility is a function of the sum of goods consumed by both partners and each partners' leisure. Partners have a time endowment T_i and faces a wage w_i where $i = 1, 2$. The family also has non-labor income y and faces a price p for consumption goods, under a common budget constraint.

- (a) What does (1) imply about the MRS between the two partners's consumption? Is this a romantic conceit or misleading impossibility? Propose an objective function that loosens this restriction.
- (b) Suppose family members must each satisfy an individual budget constraint. Explain without too much math why this makes the *family* worse off with or without a unitary utility function of the form described by (1).
- (c) Returning to a common family budget constraint and the Unitary family's preferences, write down 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 j 's wage. How does consumer theory restrict the substitution matrix?
- (d) Totally differentiate the labor supply functions, assuming $dp = 0$. Substitute your results from (c) to obtain

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

where $B_i = \partial h_i / \partial y$. Use this equation and what you know about the Slutsky matrix to show that the introduction of a negative income tax must reduce family earnings, though it need not reduce both partners' earnings.

- (e) Suppose the partners in question are same-sex instead of a traditional husband and wife. How might the family problem change in this case?

4. Life-cycle labor supply

- (a) Derive the β -constant labor supply and commodity demand functions for the Heckman and MaCurdy (1980) utility function. Assume the interest rate is fixed.
- i. What's the intertemporal substitution elasticity in this model? Why is this parameter sure to be positive (as a matter of theory)? How do wages affect consumption? Why?
 - ii. Use the model to sign and compare behavioral responses to the following sources of variation in wages: Cross-sectional variation associated with permanent differences in human capital; Wage increases generated by changes in labor market experience; Transitory shocks caused by changes in the macro economy; Changes in after-tax wages caused by a temporary NIT program; Anticipated retirement at age 50; Unexpected job loss at age 50.
- (b) Construct a PSID extract similar to the one used by Angrist (1991). PSID data are available from the ISR:

<http://simba.isr.umich.edu/Zips/ZipMain.aspx>

(use the Wave I cross-year individual file).

- i. Calculate the grouped-data, Analysis of Covariance (fixed-effects), and OLS estimates of MaCurdy's (1981) specification reported by Angrist (1991, Table 3).
- ii. How does Angrist (1991) explain differences in results across methods?
- iii. Why does Card (1994) take a skeptical view of the large positive intertemporal substitution elasticities generated by the grouped-data estimator in PSID data? Does evidence on the labor supply responses of bicycle messengers, cab drivers, and lobstermen address Card's concerns?

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