Part IIB: Neoclassical Model of Labor Supply II

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The Participation Decision

- Recall that a worker that chooses to not work (i.e., $h = 0$) is at their endowment point E
- At this point, the worker consumes $L = T$ hours of leisure and V dollars of consumption goods
- The worker can choose to enter the labor market and will give up leisure time for earnings which can be used to purchase more consumption goods
- What factors motivate an individual to enter the labor force?

The Reservation Wage

- **Reservation wage:** The wage at which an individual is indifferent between staying out of the labor force (working no hours) and participating in the labor force (working positive hours)
- The reservation wage is the slope of the indifference curve at the endowment point
- Thus, it is given by the $MRS_{L,C}$ at the endowment point where $C = V$ and $L = T$

The Reservation Wage

- A person will not work at all if the market wage is less than the reservation wage: $w \leq w^{res} \Rightarrow h^* = 0$
- If the market wage is greater than their reservation wage, the worker will enter the labor force: $w > w^* \Rightarrow h^* > 0$

Example

Cindy has the utility function $U(C, L) = C \cdot L$. This functional form implies that Cindy's marginal rate of substitution is C/L. Cindy receives \$660 each week from her grandmother, regardless of how much she works. Assuming there are 110 hours each week available to split between work and leisure, what is Cindy's reservation wage?

Comparative Statics: A Change in Non-Labor Income

- The effect of non-labor income on participation is unambiguous under the assumption that the marginal utility of consumption decreases as consumption rises ("diminishing marginal utility of consumption")
- Assuming diminishing marginal utility of consumption holds, an increase (decrease) in non-labor income will lead to a decrease (increase) in labor force participation

Comparative Statics: A Change in Wages

- Effect of change in wage on participation is unambiguous
- The increase in the wage rate will raise the wage above the reservation wage for some workers
- Thus, an increase in the wage rate increases labor force participation

Comparative Statics: A Change in Wages

- An increase in the wage only generates an income effect if the person is already working
- For a non-worker, a wage increase only makes leisure time more expensive, and thus is more likely to draw them into the work force

Readings

- Borjas 2.6

Labor Supply Elasticity

Example

Cindy has the utility function $U(C, L) = C \cdot L$. This functional form implies that Cindy's marginal rate of substitution is C/L. Cindy receives \$660 each week from her grandmother, regardless of how much she works. Assume there are 110 hours to allocate between consumption and leisure each week.

(a) *What is Cindy's reservation wage?*

(b) *If the wage rate is \$15 an hour, how many hours will Cindy work?*

(c) *If the wage rate is \$20 an hour, how many hours will Cindy work?*

(d) *If the wage rate is \$25 an hour, how many hours will Cindy work?*

Labor Supply Elasticity

- The relationship between hours of work and the wage rate is the **labor supply curve**
- A measure of how responsive workers are to changes in the wage rate is given by

$$\varepsilon_{h^*,w} = \frac{\%\Delta h^*}{\%\Delta w} = \frac{\Delta h^*}{\Delta w} \cdot \frac{w_0}{h_0^*}$$

- Hours worked are more responsive to changes in the wage rate the greater the absolute value of the labor supply elasticity

Labor Supply Elasticity

- If $|\varepsilon_{h^*,w}| < 1$, the labor supply curve is said to be *inelastic*
- If $|\varepsilon_{h^*,w}| > 1$, the labor supply curve is said to be *elastic*.
- If the substitution effect dominates the income effect, what does that imply about the sign of labor supply elasticity?
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Labor Supply Elasticity

- Typical empirical model to estimate relationship between hours worked and wages:

$$h_i = \beta w_i + \alpha V_i + \text{other variables}$$

- α: Effect of \$1 increase in non-labor income on work hours
- β: Effect of \$1 wage increase on work hours

Labor Supply Elasticity

- What do we expect the sign of α to be?
- What do we expect the sign of β to be?

Labor Supply Elasticity

- Empirical studies have found numerous estimates for the labor supply elasticity of prime-age males
- Taken together, "consensus" estimate of male labor supply elasticity is approximately $-.10$
- Take aways:
  - Income effect seems to dominate
  - Inelastic labor supply curve
  - Elasticity likely varies throughout life cycle
  - Elasticity likely different between men and women

Labor Supply Elasticity

- Main issues with empirical estimation:

1. Hours of work
   - Time horizon being considered is important
   - Measurement error in self-reported work hours
2. The wage rate
   - Measurement error
   - No wage observed for non-participants (self-selection)
3. Non-labor Income
   - Non-labor income today may come from previous work savings

Readings

- Borjas 2.7-2.8

Motivation

- Impact of income maintenance programs is a hotly debated issue
- Major part of labor market policy: How can we use policy to mitigate the ills of poverty?
- How do individuals react to different policy structures?
- Which policies actually work?

Motivation

- Poverty guidelines are issued each year by the Department of Health and Human Services
- Guidelines are used for administrative purposes (e.g., determining financial eligibility for federal programs)
- 2016 guidelines were calculated using the 2014 Census Bureau's poverty thresholds and adjusting for inflation by using the CPI

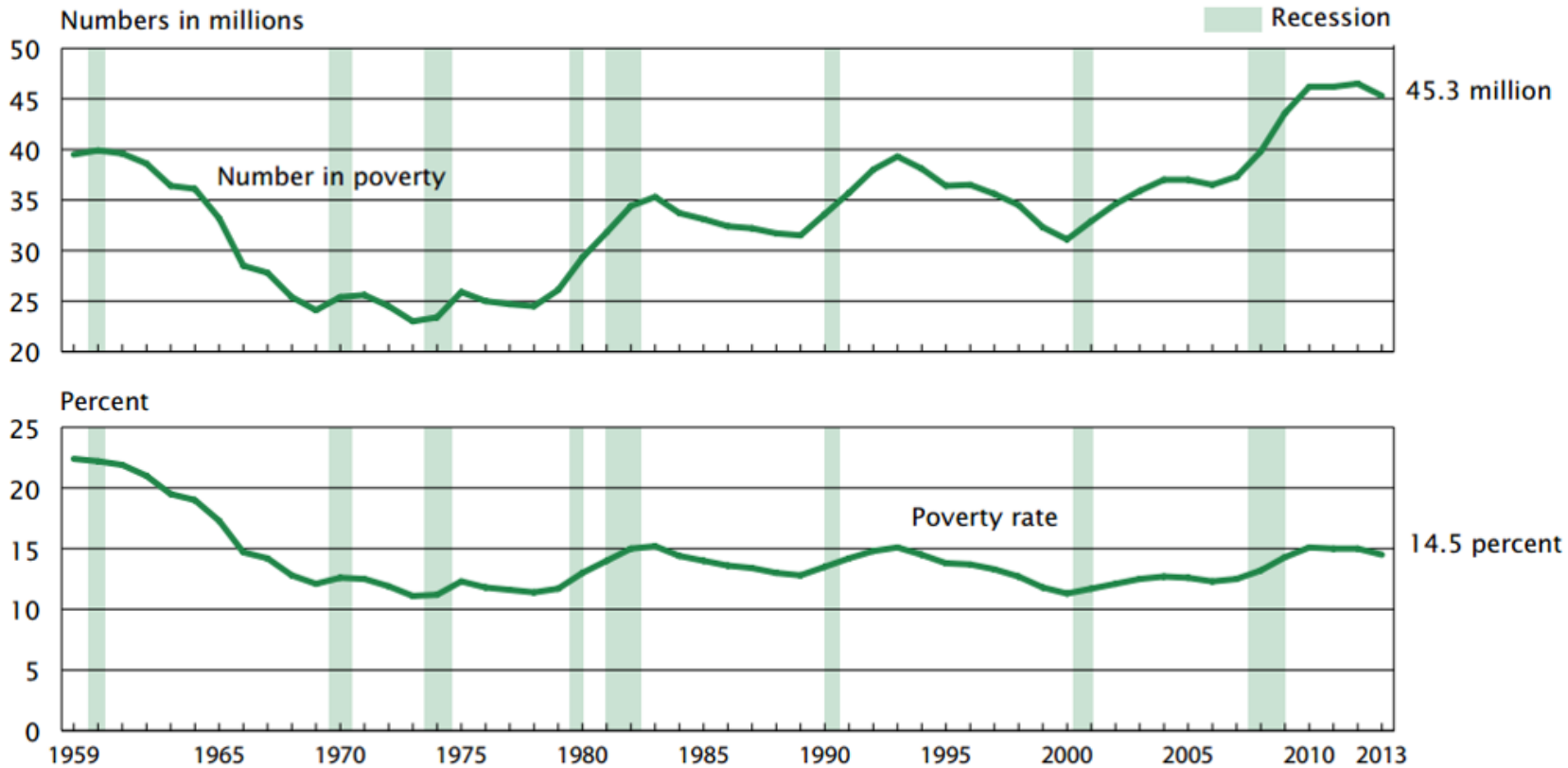
Motivation

2016 POVERTY GUIDELINES FOR THE 48 CONTIGUOUS STATES AND THE DISTRICT OF COLUMBIA	
PERSONS IN FAMILY/HOUSEHOLD	POVERTY GUIDELINE
For families/households with more than 8 persons, add $4,160 for each additional person.	
1	$11,880
2	16,020
3	20,160
4	24,300
5	28,440
6	32,580
7	36,730
8	40,890

Figure: U.S. Federal Poverty Guidelines, 2016

Motivation

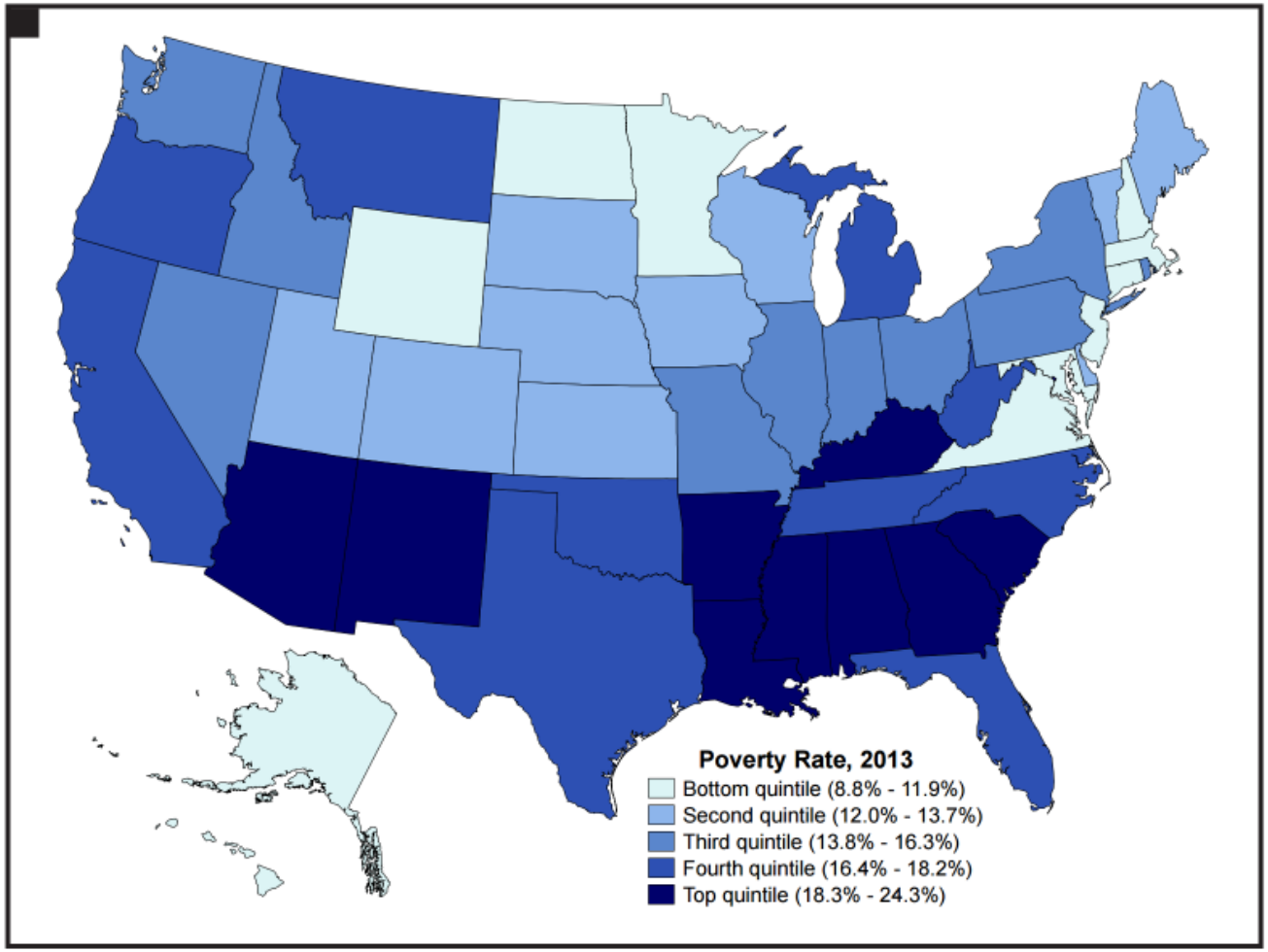
Figure 4.
Number in Poverty and Poverty Rate: 1959 to 2013



Note: The data points are placed at the midpoints of the respective years. For information on recessions, see Appendix A. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see <ftp://ftp2.census.gov/programs-surveys/cps/techdocs/cpsmar14.pdf>.

Source: U.S. Census Bureau, Current Population Survey, 1960 to 2014 Annual Social and Economic Supplements.

Motivation



Source: Ruggles et al., 2010, IPUMS 2013 ACS.

Figure: U.S. Poverty Rates by State, 2013

Normative vs. Positive Economics

- Prediction about individuals' responses are "positive" statements
  - Positive economics address the question: "What happens?"
  - In principle, can address these questions without interjecting value judgments about the desirability of the outcome
- Lots of policy debate concerns "normative" issues
  - Normative economics addresses "What should be?" questions
  - Answers to these questions require value judgments
- Something to keep in mind during our analysis

The Impact of Welfare on Labor Supply: AFDC/TANF

- Aid to Families with Dependent Children (AFDC) paid a lump-sum payment which was phased out with labor earnings
- Replaced by Temporary Aid for Needy Families (TANF) in 1996, which placed time limits on program eligibility
- Format:
  - Monthly lump-sum transfer payment (varied based on year, state, etc.)
  - Each dollar earned in the labor market lead to a decrease in the lump-sum payment (often a large decrease, like \$0.67 per \$1.00 earned in the labor market).

The Impact of Welfare on Labor Supply: AFDC/TANF

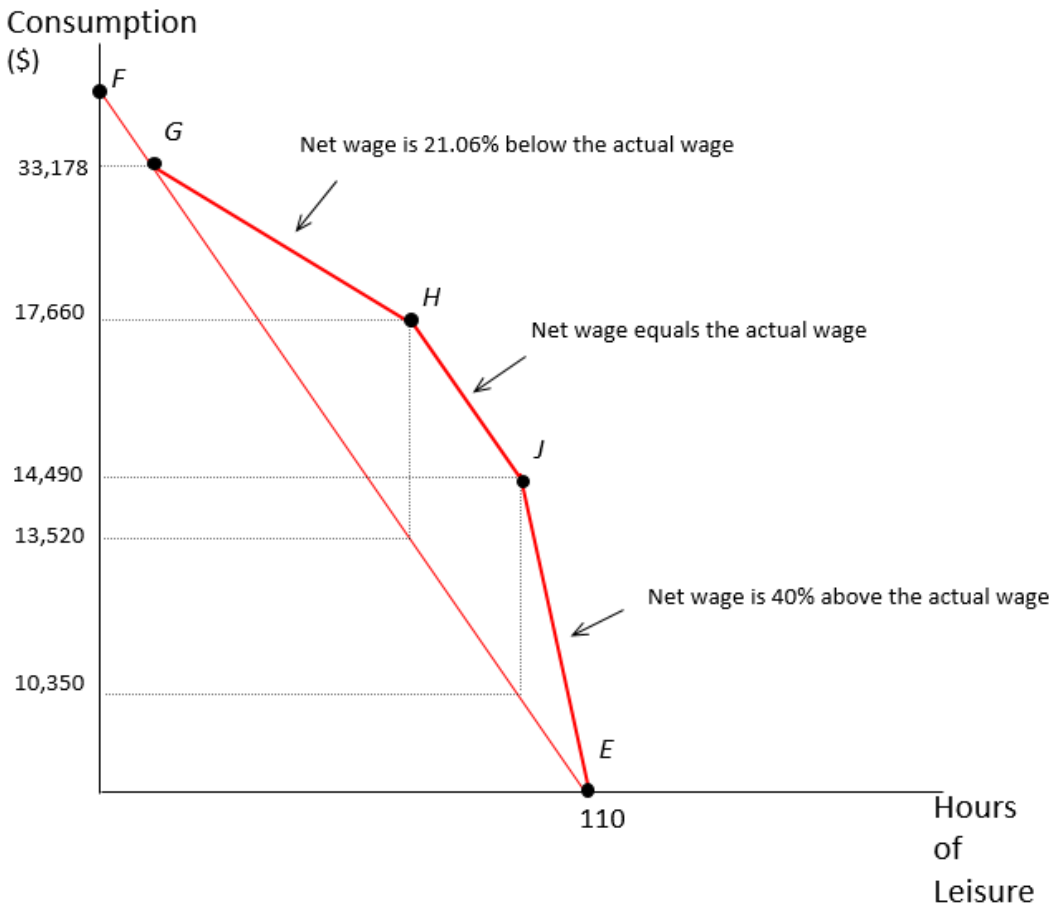
- Two important changes to an individual's budget line due to this type of welfare program:
  1. The endowment point shifts up
  2. The (absolute) slope of the budget line decreases
- Model predictions:
  1. Awarding cash grants reduces the probability of individuals entering the labor force
  2. Cash grants also induce workers who remain on the job to reduce their work hours
  3. Tax on labor earnings reduces the price of leisure and lowers the number of hours worked by recipients

The Earned Income Tax Credit

- Largest current anti-poverty program outside of Medicaid
- Format: Consists of three key pieces:
  1. Phase-in area: For first \$X earned in labor market, wages subsidized by %S
  2. Plateau area: For next \$Y earned in labor market, 0% tax/subsidy rate
  3. Phase-out area: For dollars earned over \$X+\$Y, wages taxed by $\%\tau$

The Earned Income Tax Credit

- Example: 2008, 2 children
  1. \$0 - \$10,350: Each dollar earned receives $S = .40$ subsidy
  2. \$10,350-\$13,520: Each dollar earned receives 0% tax/subsidy
  3. \$13,530-\$33,178: Each dollar earned subject to τ=.2106 tax.



The Earned Income Tax Credit

- How does the EITC affect labor supply?
- Testable predictions:
  1. EITC increases labor force participation
  2. Impact on hours worked by those already in the labor market is less clear
  3. Workers bunch at two specific "kink" points

The Earned Income Tax Credit: LFPR

- EITC increases the net wage for non-workers
- Thus, for a given reservation wage, EITC increases likelihood the net wage exceeds an individual's reservation wage
- EITC should increase the labor force participation rate for targeted groups

The Earned Income Tax Credit: LFPR

- Empirical evidence: Eissa and Leibman (1996). "Labor Supply Response to the Earned Income Tax Credit", Quarterly Journal of Economics 111.2
  - EITC increased subsidy to women with children in 1986
  - How did this change labor force participation?

The Earned Income Tax Credit: LFPR

- Run a "difference-in-difference" calculation, once controlling for demographics, education, etc.
- Finding: Increase in EITC subsidy level lead to 2.4 percentage point increase in LFPR among treatment group.

The Earned Income Tax Credit: LFPR

- Run a "difference-in-difference" calculation, once controlling for demographics, education, etc.
- Finding: Increase in EITC subsidy level lead to 2.4 percentage point increase in LFPR among treatment group.
- No significant impact on work hours for those already in the labor force

The Earned Income Tax Credit: Bunching

- Different preferences lead to different choices of labor and leisure.
- But, lots of workers should find optimal bundle lies at one of two "kink points."
- Prediction is clearly made in our model. Is it reasonable? Requires workers to:
  1. Know the tax code well enough to tailor their decisions to it.
  2. Have the ability to adjust their hours worked in response to the policy.

The Earned Income Tax Credit: Bunching

- Empirical Evidence: Emmanuel Saez, "Do Taxpayers Bunch at Kink Points?". American Economic Journal: Economic Policy (2010)
- Statistically test whether individuals bunch at kink points.
- Basically, test whether the density of workers is really high near the relevant kinks.

The Earned Income Tax Credit: Bunching

- Mixed evidence:
- "Bunching" occurs, but only at the first kink point, and only among the self-employed.
- Why?
  - Ability to adjust hours worked
  - More cynically, tax fraud

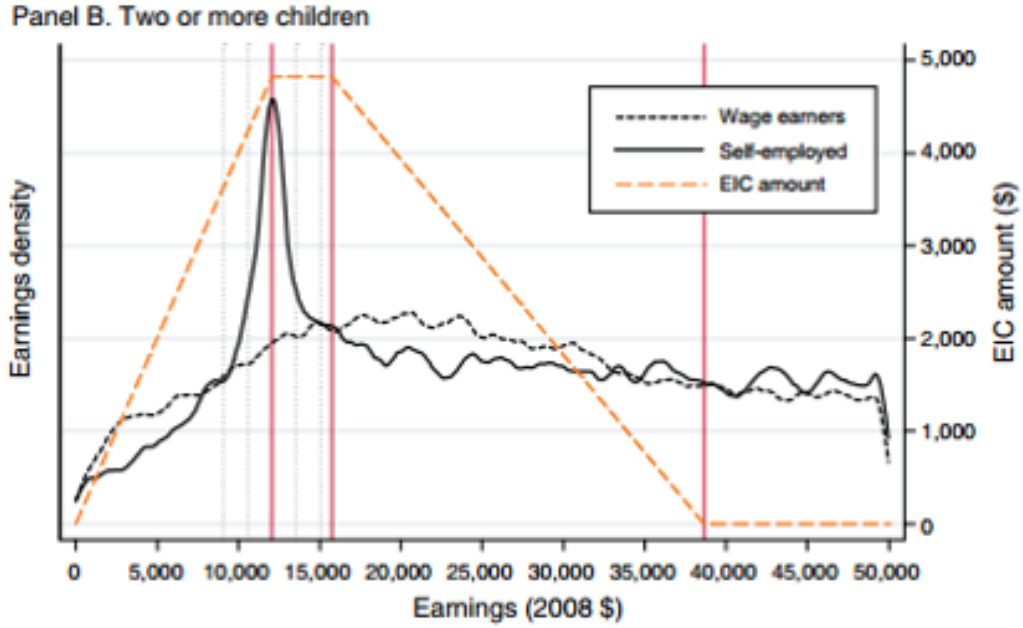


FIGURE 4. EARNINGS DENSITY AND THE EITC: WAGE EARNERS VERSUS SELF-EMPLOYED

Readings

- Borjas 2.10-2.11