Labor Supply and Labor Market Equilibrium

Chapter 3
1. Labor supply

2. Labor market equilibrium

3. Unemployment

4. Adverse supply shock
1 Labor Supply by the Household

Begin with simple one-period model with no savings (add savings later)

- Consumer preferences - consumption and leisure both yield utility
  \[ U = u(c, l) \]

- Indifference curves - combinations of \( c \) and \( l \) for which the agent receives the same level of utility
  - slope downward from left to right — to be willing to give up one good must receive more of the other
– higher indifference curves represent higher levels of utility - holding one good constant and increasing the other raises utility

– bowed toward the origin due to the law of diminishing marginal utility
• Budget constraint

\[ c = a + \varpi N = a + \varpi (h - l) \]

where \( a \) includes resources available to the household including non-wage income and wealth.

– Graph \( c \) as a function of \( l \)
  * slope is \(-\varpi\)
  * intercept is \( a + \varpi h\)
  * upper bound on \( l \) of \( h\)
• Behavior is utility maximization subject to the budget constraint
  – Find tangency of budget line to highest indifference curve
How do household’s desired work hours respond to an increase in the current wage ($\bar{w}$)

- budget line becomes steeper from its kink at $h$

  * Substitution effect - holding utility constant, an increase in the real wage will cause the household to substitute out of leisure and into consumption, implying that he works more

  * Income effect - an increase in the real wage relaxes the budget constraint, allowing the agent to have both more consumption and leisure

  * Generally believe the substitution effect dominates for an increase in the current real wage, all else constant.
• How do household’s desired work hours respond to an increase in the agent’s non-labor income? \((a)\)

– intercept increases, shifting budget constraint rightward

* leisure and consumption increase

* labor supply falls.
• How do household’s desired work hours respond to an increase in the agent’s expected future wage?

  – * not really in the model - when we expand it to allow the agent to borrow against his future income, we will analyze this as an increase in $a$

  * what does this imply about the effect of a permanent increase in the agent’s real wage?
• Household labor supply

  – Work hours the household would like to provide at each given real wage.

  – Labor supply is an upward sloping function of the real wage.

  – Labor supply shifts inward when non-labor income increases and when expected future wages increase.
• Aggregate labor supply
  – Add up all household supplies
  – Additional shifts to the right
    * increase in working-age population
    * increase in participation rate
2 Labor Market Equilibrium

- Equilibrium occurs where $ND = NS$.

- Denote equilibrium values with overbar’s $\bar{N}$ and $\bar{\sigma}$.

- Why is this an equilibrium?

- What is the value of employment? of unemployment?
3 Unemployment

- Full employment output = potential output = $\bar{Y} = AK^\alpha \bar{N}^{1-\alpha}$, where $\bar{N}$ is equilibrium (market-clearing) output
  - $\bar{N}$ is determined in the current period, but $K$ is determined by decisions made last period
  - anything that changes $\bar{N}$ will change $\bar{Y}$

- Natural rate of unemployment = $\bar{u}$ = rate of unemployment that prevails when output is equal to potential - consists of frictional and structural unemployment
• Cyclical unemployment = \((u - \bar{u})\) = unemployment which differs from the natural rate

• Okun’s Law

\[
\frac{\bar{Y} - Y}{\bar{Y}} = 2(u - \bar{u})
\]
4 Supply shock = change in A

What is the effect on $\bar{Y}$ of a fall in A?

- Direct effect

- Indirect effect through effect on $\bar{N}$

- Effect on future $\bar{Y}$? (consider persistence of the shock)

- Give an example of an adverse supply shock
5 Summary

- Household labor supply is an upward sloping function of the real wage

- Household labor supply shifts right
  - Wealth falls
  - Expected future wages fall

- Aggregate labor supply adds up all household labor supply
  - Additional rightward shifts
    * Labor participation rate rises
* Working-age population rises

- Labor market equilibrium determined by intersection of labor supply and labor demand
- Equilibrium employment and unemployment