Part III

Fluctuations

9 Households

A simple model of fluctuations: 1 period Representative Household

•We think of fluctuations as responses of private sector to changes in the environment.

•So we start building the simplest notion of private sector (think of models as toy economies).

•Nothing is simpler than a 1 period world with Robinson Crusoe.

•Justification: aggregation.

What are we going to do?

- Think about the goods existing in the economy.
- Think about what does Robinson prefer.
- Think about his constraints.
- Think about what will Robinson do given his preferences and his constraints

Environment

•2 goods, consumption c and leisure l, $c \geq 0$, $\quad l \in [0, h]$ (note different notation in Williamson's book than in Jones. l is leisure, n are hours worked. We represent preferences with a utility function $u(c, l)$.

1. Complete: for $\forall \left(c_i, l_i\right), \left(c_j, l_j\right)$, $u\left(c_i, l_i\right)$ is either $>$, $<$, $=$ than $u\left(c_j, l_j\right)$.

2. Transitive: for $\forall \left(c_i, l_i\right), \left(c_j, l_j\right), \left(c_k, l_k\right)$, if $u\left(c_i, l_i\right) \geq \left(c_j, l_j\right)$ and $u\left(c_j, l_j\right) \geq u\left(c_k, l_k\right)$ then $u\left(c_i, l_i\right) \geq u\left(c_k, l_k\right)$.

•The utility function can have monotonic transformations.

Indifference Curves

•Loci of pairs (set of points) such that: $u(c_i, l_i) = u\left(c_j, l_j\right)$.

•If we assume that preferences are strictly monotonic, convex and normal, the indifference curves are:

1. Negative sloped in l.

2. Convex.

•We work with differentiable utility functions.

•Draw indifference curves

Budget Constraint

- Leisure $l \Rightarrow$ hours worked n.

- Wage w.

- Then $\qquad c + l\, w = h\, w + \pi - T = h\, w + \pi - T$ or more commonly

$$c = (h - l)\, w + \pi - T = n\, w + \pi - T$$

- Interpretation for Robinson.

Household's Problem

- Problem for Robinson is then

$$\begin{aligned} \max_{c,l} \quad & u\,(c,l) \\ \text{s.t.} \quad c \;&= (h-l)\;\, w + \pi - T \end{aligned}$$

- First order condition: $\frac{u_l}{u_c} \;=\; w$

- The marginal rate of substitution (MRS) equals the relative price of leisure.

- We express the solution as a pair of functions that give us the demand for consumption and for leisure and we write them

$$\begin{aligned} l^{hh} \;&=\; l^{hh}(w, \pi - T) = h - n^{hh}(w, \pi - T) \\ c^{hh} \;&=\; c^{hh}(w, \pi - T) \end{aligned}$$

  we write n^{hh} to make clear that this is the choice of the household

A Parametric Example

- $u(c,l) = \log c + \gamma \log l$ and $c = w\ (h - l) + \pi - T = w\ n + \pi - T$.

- First Order Condition and Budget constraint:

$$\text{MRS}_c^l = \frac{\frac{\gamma}{l^*}}{\frac{1}{c^{hh}}} = \gamma \frac{c^{hh}}{l^{hh}} = w$$

$$c^{hh} = (h - l^{hh})\ w + \pi - T$$

- Then:

$$l^{hh} = \frac{\gamma}{1+\gamma} \frac{h\ w + \pi - T}{w}$$

$$c^{hh} = \frac{1}{1+\gamma} \{h\ w + \pi - T\}$$

Income and Substitution Effect

- We will use the followimg (Hicksian) decomposition.

- Substitution Effect: changes in w make leisure change its relative price with total utility constant.

- Income Effect: changes in w induce changes in total income even if l^* stays constant.

- For $u(c,l) = \log c + \gamma \log l$ income and substitution effect cancel each other!