ECON 7010 - Macroeconomics I

Fall 2015

Notes for Lecture #10

Today:

- Models of economic fluctuations with money

Overview of what we've done:

	Theory (core)	Application (Macro)
II Dynamic Optimization	- Dynamic Programming - existence - solving it	- Houshold, Firm, Growth
III OG (no uncertainty)	GE Perfect foresight Welfare theorems	- Foundation of $ economics - Macro dynamics
IV $: Aggregate Fluctuations	Rational Expectations Equlibrium (A generalization of perfect foresight)	- corr($,Y) - nominal vs real sides of economy

$: Aggregate Fluctuations

- Why is $ demanded?
  - OG model emphasizes money as a store of value
  - This generalizes a demand for money in equilibrium
- Why do changes in $ influence real variables (Y,C, etc)?
  - Neutrality of money
    - Changes in $ have NO real effects
    - This is called the "classical dichotomy": can solve for real side of economy separately from the $ side (DRAW: real and $ with separating hyperplane)
    - w/ OG model, we solved for $\{n_t, \rho_t\}_{t=1}^{\infty}$ (the real variables) apart from M (they are independent of the money supply). After solving for that, we went back and solved for $\{p_t\}_{t=1}^{\infty}$ w/ M and n_t sequence. (e.g., see diff equation in model with production - no M in it)
  - How to break the neutrality (Classical Dichotomy) result?
    - Distributional effects (non-proportional transfers) - Next week
    - Imperfect information - Next week or 2 weeks
    - Sticky wages/prices - future

$: Aggregate Fluctuations, the model

- OG model w/ production (same as before)
- Stochastic money supply:
  - $M_{t+1} = M_t \tilde{x}_{t+1}$, where $\tilde{x}_{t+1}$ is an iid random variable
  - $\Rightarrow lnM_{t+1} = lnM_t + ln\tilde{x}_{t+1}$, so M_{t+1} is also a random variable

- DRAW out time line: period t starts, choice n_t, sell output for $p_t n_t$, period $t+1$ starts, x_{t+1} determined, trade money for consumption c_{t+1}, die

- Proportional transfers
  - Know distribution of x_t
  - Note that monetary policy affects decisions in two ways
    1. Realizations of x_t
    2. Distribution of x_t

- Optimization of a representative, young generation t agent (a price taker):
  - Preferences: $u(c_{t+1}) - g(n_t)$
  - Budget constraint: $c_{t+1} = \frac{p_t n_t x_{t+1}}{p_{t+1}} = \rho_t n_t x_{t+1}$, proportional transfers because shock to money supply is proportional to the money holdings of agent
  - Problem is: $\max_{n_t} E_{(x_t, p_{t+1}|M_t, p_t)} u\left(\frac{p_t n_t x_{t+1}}{p_{t+1}}\right) - g(n_t)$
    * Compute expectation w.r.t. x_{t+1} using known distribution
    * What is the distribution of p_{t+1}?
      · Determined in the Rational Expectations Equilibrium
      · Lots of them - they depend upon how you define the REE
      · Rational expectations equilibrium:
      · Kind of a deep concept - more than individuals right on average
      · It's an equilibrium concept!
      · Idea is: Individuals beliefs about the distribution of endogenous variables are consistent with the actions they take given these beliefs
      · That is, beliefs induce behavior that is consistent with beliefs

Applications of REE

1. Stochastic money supply: $M_{t+1} = M_t x_{t+1}$
2. Technology shock: $y_t = \tilde{A}_t f(n_t)$, where $\tilde{A}_t$ is a random shock
3. Tastes: $u(c_{t+1}) - \tilde{\gamma}_t g(n_t)$, where $\tilde{\gamma}_t$ is a random taste shock to disutility of labor
4. Population shock: $\tilde{N}_t$