ECON5020 – Macroeconomics

Week 32 - Real Business Cycles

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New Keynesian BC Theory

There is an important distinction between Real Business Cycles and New Keynesian Business cycle. Answers below, unless stated, are about Real Business Cycles

- **Main Shocks Explaining BC:**
  - Technology Shock (A_t)
    - Sometimes know as TFP shock
    - It's an abstraction, but some shocks can resemble technology shock (Covid, terms of trade, oil shock etc.)
- **Propagation Mechanism:**
  - Exogenous shock affects variables according to endogenous relations given within the model.
  - In a case of a productivity shock:
    - Increase in technology $\rightarrow$ increase MPL $\rightarrow$ Increase in Labour demand $\rightarrow$ Increase in real wage and labour supply.
    - Higher wages $\rightarrow$ consumption smoothing across time $\rightarrow$ higher return in capital and more investment/savings.
- **Changes in Unemployment:**
  - Unemployment in RBC is efficient and voluntary. In New Keynesian: involuntary
- **Keynesian BC with fully flexible prices:**
  - Strictly think about New Keynesian BC, under flexible prices, there's no cycles – main propagation mechanism is nominal rigidities.

Variables in RBC Models

- **Real Wages:**
  - In RBC theory: wages are pro-cyclical. As technology affects MPL, it affects real wages via clearing condition ($w = MPL$).
  - In New Keynesian: nominal rigidities are in place. So real wage is a-cyclical.
- **Aggregate Demand:**
  - Components of AD are affected by the shocks and are pro-cyclical:
    - Consumption is affected by wage changes
    - Investment is affected by return on capital.
    - Government spend possibly affected by tax revenues.

Labour Demand and Supply – RBC

- **Labour Demand:**
  - Labour demand is derived from optimality condition: w = MPL
  - Marginal Product of Labour:

$$\frac{\partial Y}{\partial L} = A(1-\alpha)\left(\frac{\bar{K}}{L^d}\right)^{\alpha} = w \implies$$

$$L^d = \left(\frac{A(1-\alpha)\bar{K}^{\alpha}}{w}\right)^{\frac{1}{\alpha}}$$

- **Labour Supply:**
  - Labour Supply is derived from the utility maximization of the household:

$$\max \frac{C^{\gamma}}{\gamma} - \frac{(L^s)^{\theta}}{\theta} \text{ s.t. } C = wL^s$$

$$U = \frac{(wL^s)^{\gamma}}{\gamma} - \frac{L^{\theta}}{\theta} \implies$$

$$\frac{\partial U}{\partial L^s} = 0 \implies (wL^s)^{\gamma-1}w - L^{\theta-1} = 0 \implies L^s = w^{\frac{\gamma}{\theta-\gamma}}$$

Labour Demand and Supply – RBC

- **Equilibrium Wage:**
  - We can find the wage by setting $L^s = L^d$:

$$L^s = w^{\frac{\gamma}{\theta-\gamma}} \qquad\qquad L^d = \left(\frac{A(1-\alpha)\bar{K}^{\alpha}}{w}\right)^{\frac{1}{\alpha}}$$

$$w^{\frac{\gamma}{\theta-\gamma}} = \left(\frac{A(1-\alpha)\bar{K}^{\alpha}}{w}\right)^{\frac{1}{\alpha}}$$

$$w^* = \left(A(1-\alpha)\bar{K}^{\alpha}\right)^{\frac{\theta-\gamma}{\theta-\gamma(1-\alpha)}}$$

- Plugging the values in w^* yields $w^* = 2.11$.
- If we plug this value in either labour supply or labour demand we have: $L^s = (2.11)^{\frac{.5}{2-.5}} = 1.28$
- An increase in TFP by 10%: $A = 2.2 \implies w^* = 2.30 \quad L = 1.32$