Chapter 9

- Stylized facts in Business Cycles: co-movements (procyclical, countercyclical or acyclical) with cycles in GDP.
  - In particular, Capital Utilization (procyclical) and Employment (procyclical).
- Capital Utilization rate $\kappa$. (100%? think about it)
  - Capital $K$. Owners choose $\kappa$. Capital Service $\kappa K$
  - $Y = A \cdot F(\kappa K, L), \delta(\kappa)$ (increasing and convex).
  - Rate of return on capital: $\frac{R}{P}\kappa - \delta(\kappa)$. Maximization yields $\delta'(\kappa) = \frac{R}{P}$. $\frac{R}{P} \uparrow \Rightarrow \kappa \uparrow$, why?
  - Procyclical: $technology(A) \uparrow \Rightarrow MPL \uparrow \Rightarrow Demand for K \uparrow \Rightarrow \frac{R}{P} \uparrow \Rightarrow \kappa \uparrow$ (read Figure 9.6 in Barro)
  - $i = \frac{R}{P}\kappa - \delta(\kappa)$
- Practice Question 1
  - a. In the above model, what is the relationship between $i$ and business cycles, i.e. procyclical, countercyclical or acyclical?
  - b. Consider the hypothetical specification: $Y = (\kappa K)^{\frac{1}{4}} L^{\frac{3}{4}}, K^* = 1, L^* = 1, \delta(\kappa) = 0.5\kappa^2$. What is the equilibrium interest rate on bond in this model? What if $\delta(\kappa)$ is constant (assuming $\kappa \leq 1$)?
- Labor Force, Unemployment/Employment
  - Basic Solow Model $\Rightarrow$ Full Employment? (think about what’s happening in Wall Street now.) How to characterize ‘Procyclical’?
  - Key idea: Search, either by Persons or by Firms, requires time.
  - Employment rate, Unemployment rate $u$, Vacancy rate, Help-wanted ads.
  - $u$ is very important (why?). Basic solow model fails to capture the ‘correlation’ between $u$ and GDP cycles.
- Job finding
  - Elements: Search, Unemployment insurance, Reservation real wage, Job-finding rate, Duration of unemployment.
  - Case: Unemployment rate (Western Europe versus U.S.)
  - Procyclical: $Technology(A) \uparrow \Rightarrow MPL \uparrow \Rightarrow Demand L \uparrow \Rightarrow$ wage offer distribution shifts (how?) $\Rightarrow$ Job finding rate $\uparrow$
    * Caution! Job finding rate is different from unemployment rate!
- Job-separation rate, the rate at which job matches dissolve.
  - If there is no job separation, eventually, there will be no unemployment/vacancy.

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10/21/2011. Handout in last week should, virtually, be Handout 4
• Natural Unemployment Rate: $u'' = \frac{\sigma}{\varphi + \sigma}$
  $\varphi U - \sigma L$, job findings minus job separations

• 'Procyclical' Employment
  $Technology(A) \uparrow \Rightarrow \varphi \uparrow \Rightarrow u'' \downarrow$

• Tips: try to clearly understand those concepts and various 'rates' in this chapter.

> Chapter 10

• A brief review: Fiat Money, Commodity Money. Hand-to-hand currency. High-powered money/Monetary Base. M1 and M2...

• In our model, focus on hand-to-hand currency, bearing zero interest rate.

• Demand analysis of Money
  $\varphi U - \sigma L$, job findings minus job separations
  - Definition: Average money holding. Real demand for money.
  - No interest rate, why money? $i (B + PK)$. TRANSACTION COST!
  - Trade-off: low money holding (high interest income) versus high transaction costs.
  - $M^d = P \cdot L (Y, i)$
  - Total (real) cost: Interest cost + Transaction cost. $T \uparrow \Rightarrow Interest cost \uparrow$, $Transaction cost \downarrow$.
    Thus, choose $T^*$

• Supply of Money: weakly procyclical.
  - Equilibrium: $M^s = M^d = P \cdot L (Y, i) \iff \frac{M^s}{P} = L (Y, i)$

• Price: Countercyclical. (Read Figure 10.4 in Barro)
  $Technology(A) \uparrow \Rightarrow Y \uparrow \Rightarrow M^d \uparrow (i \uparrow) \Rightarrow P \downarrow$.

• Practice Question 2: Taste the general equilibrium
  - Consider the following hypothetical economy of apple. Assume there is only one good, say, apple, in the world which is evolving like a basic solow model with $s = 0$, $\delta = 0$, $n = 0$, $\alpha = 0.5$, $A = 1$, $L^s = 1$, $K^s = 1$. 'Apple king' prints fiat money $M^s = 2$. Assume that you will be charged a transaction fee $2$ every time you go to the bank (and this will be the only cost associated with transaction). What is the price of the apple?
    * Hint: recall that the money (real) demand function is $\frac{M^d}{P} = \frac{1}{2} \sqrt{C} \sqrt{\frac{2\gamma}{T}}$.

• Reminder: Homework #2
  - Due: Oct 27 by 5 PM in my TA mailbox.
  - Ch.7: Problems 5, 6. Ch.8: Problems 4, 5. Ch.9: Problem 8. Ch.10: Problem 9, 11, 12. Ch.11: Problem 10, 14
  - Please write down the number of discussion section that you are currently attending, or the time of the section.

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2Here we try to balance the materials covered in class with those mentioned in Barro