Macro Field Exam, August 2013

Section 1

Short questions (True/False + a brief explanation; explanation determines the grade; 20 minutes):

A. Unemployment rate is a leading indicator of U.S. business cycles. (2 minutes)
B. Government consumption is strongly negatively correlated with output in U.S. business cycles. (2 minutes)
C. Real interest rates fall in recessions in the U.S. (2 minutes)
D. Taylor principle guarantees determinacy in the basic New Keynesian model for any positive steady-state inflation (2 minutes).
E. A negative correlation between the price level and output for the U.S. suggests that the predominant source of business cycles is demand side shocks (2 minutes).
F. The Great Inflation in the U.S. ended in the early 1980s because of more aggressive fiscal policy responding to high unemployment rate. (5 minutes)
G. Fiscal multipliers are usually above one in basic real business cycle models. (5 minutes).

Longer question (40 minutes)

Consider the model of business cycles as in Baxter and King (1991).

Firms:

- Continuum of firms $i \in [0,1]$.
- Each firm maximizes profits.
- The price of the final good produced by each firm is normalized to 1.
- Firms face perfect competition in the product and factor markets.
- Inputs (labor L and capital K) are perfectly mobile across firms.
- Production function of firm i is given by $Y_{it} = Z_t E_t L_{it}^\alpha K_{it}^{1-\alpha}$ where Z_t is a measure of exogenous technology and E_t captures production externality, which firms take as given.
- Production externality is $E_t = Y_t^{1-\frac{1}{\gamma}}$ where $Y_t = \int Y_{it} di$ is the aggregate output and $\gamma \geq 1$.

Households:

- Maximize lifetime utility $\sum \beta^t \{\log(C_t - \Delta_t) + \log(1 - L_t)\}$
  subject to $A_{t+1} + C_t = (1 + r_t)A_t + W_t L_t + \Pi_t$ where A_t is the wealth of households, r_t is the interest rate net of depreciation (the depreciation rate is δ), W_t is the wage rate, Π_t is the profit (if any) from firm ownership, Δ_t is an exogenous shock to preferences.
- Households rent capital to firms.

Equilibrium/Market clearing:

- $A_t = K_t = \int K_{it} di$
- $L_t = \int L_{it} di$
- $C_t + I_t = Y_t$
- $K_t = (1 - \delta)K_{t-1} + I_t$
- The equilibrium is symmetric (i.e., all firms are identical in this equilibrium; e.g., $K_{it} = K_{jt}$ for any i and j).

A. Show optimality (first-order) conditions for capital and labor demand for firm i (i.e., how much would firms be willing to pay for inputs). (2 points)

B. Using your results from A, find the equilibrium level of profits for each firm i. (2 points)

C. Using the symmetry of the equilibrium, find the aggregate production function as a function of aggregate capital stock K_t, aggregate labor L_t, and technology Z_t. (2 points)

D. Using the aggregate production function from C, find socially optimal returns on capital and labor. How do these compare to your results in A? What does it mean for social welfare? (2 points)

E. Derive the optimality conditions for household's labor supply L_t and consumption C_t as well as A_{t+1}. (2 points)

F. Using your results from E, draw the labor supply curve in the labor market diagram with W_t on the vertical axis and L_t on the horizontal axis. What variable(s) can shift the labor supply curve? In what directions? (3 points)

G. Using your result from A draw the labor demand curve in the same labor market diagram? What variable(s) can shift the labor demand curve? In what directions? (3 points)

H. Suppose the household has an increase in Δ_t. What would be the equilibrium responses of wages, employment, output, and capital on impact if the externality E_t is held constant? (4 points)

I. How do the responses in H change if E_t is allowed to vary? What does it mean for the ability of this real business cycle model to match stylized facts about business cycles? (5 points)

J. As you increase γ, what happens to the labor demand curve? Is it possible to generate an upward sloping labor demand curve? If yes, how does it affect your answer in I? (5 points)

K. If the labor demand curve is steeper than the labor supply curve, is there any qualitative change in the properties of this real business cycle model? If yes, explain the intuition and what it means for the volatility of variables in the model and for matching stylized facts about business cycles. (10 points)

Section 2

What role might the absence or presence among market participants of *common knowledge of economic fundamentals* play in determining the circumstances in which speculative attacks on a currency can occur? Illustrate using concrete models of currency crisis. (1 hour)

Section 3

Four short questions, 15 minutes each.

1) (i) What are the two basic theories for the declining share of resources devoted to agriculture as countries develop? We may want to apply either of these theories to explain the fact that poor countries devote a much larger share of resources to agriculture than rich countries, but then have to deal with the fact that countries are open to international trade. (ii) What is the problem here? What are possible solutions?

2) Explain how sector-biased TFP differences across countries can account for part of the contribution of physical and quality-adjusted human capital to the cross-country variation in income per capita, referring to Hsieh and Klenow (2007) and Erosa, Koreshkova and Restuccia (2010).

3) Consider the model of Foreign Direct Investment (FDI) as managerial capital of Burstein and Monge-Naranjo (2009) and consider consider two countries, A and B, with the same output per worker, but with A having a higher tax on the returns to foreign capital than B. Imagine that A has a higher share of resources managed by foreign capital (high FDI) than B. What do you conclude about the sources of the two countries' low productivity? (Think country-embedded productivity vs firm-embedded productivity.)

4) Explain the transition from first-generation endogenous growth models to second-generation semi-endogenous growth models (SEGM). (i) How do scale effects figure in this transition? In the simplest verstion, the SEGM has the implication that large countries should be much richer than poor ones. (ii) What are extensions of the SEGM that would avoid this counterfactual implication?