

This set contains four pages (beginning with this page)

All questions must be answered

In the evaluation, the three main questions will be weighted equally

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Spring 2008

QUESTION 1:

Evaluate whether the following statements are true or false. Explain your answers.

- (i) In the Obstfeld-Rogoff two-country model with one-period sticky prices, a permanent, unanticipated increase in the Home country's nominal money supply has no effects on Foreign output.
- (ii) Within the inflation-bias model of Barro and Gordon, it is always beneficial to appoint a Rogoff-conservative central banker even though this creates more output stability.
- (iii) In the Lucas "islands" model, an unanticipated aggregate money shock has no real effects as agents have rational expectations.
- (iv) In the basic New-Keynesian model of the closed economy, the central bank should refrain from policies that affect inflation expectations as this will worsen the inflation-output gap trade off.

QUESTION 2:

Strict inflation targeting and nominal interest rate rules

Consider the following model for output and inflation determination in a closed economy:

$$y_t = \theta y_{t-1} - \sigma (i_{t-1} - \mathbb{E}_{t-1} \pi_t) + u_t, \quad 0 < \theta < 1, \quad \sigma > 0, \quad (1)$$

$$\pi_t = \pi_{t-1} + \kappa y_t + \eta_t, \quad \kappa > 0, \quad (2)$$

where y_t is log of output in period t , i_t is the nominal interest rate (the monetary policy instrument), π_t is the inflation rate, u_t and η_t are independent, mean-zero, serially uncorrelated shocks. \mathbb{E}_j is the rational expectations operator conditional on information up to and including period j . It is assumed that $\sigma\kappa < 1$.

- (i) Discuss equations (1) and (2), with emphasis on the monetary transmission mechanism and the stability properties in absence of policy intervention (only a verbal discussion is required).

The objective of the central bank is to conduct monetary policy so as to maximize

$$U = -\frac{1}{2} \mathbb{E}_t \sum_{j=1}^{\infty} \beta^j \pi_{t+j}^2, \quad 0 < \beta < 1.$$

- (ii) Find the optimal interest rate rule for i_t as a function of π_t and y_t . (Hint: Treat $\mathbb{E}_t y_{t+1} \equiv y_{t+1} - u_{t+1}$ as the policy instrument, and solve the maximization problem by dynamic programming treating π_t as the state variable. That is, find the optimal policy as $\mathbb{E}_t y_{t+1} = B\pi_t$, where B is a parameter to be found, and use (1) and (2) to derive the associated nominal interest rate.)
- (iii) Comment on the coefficient on π_t in the optimal interest rate rule, with special emphasis on how its value affects the stability properties of the model.
- (iv) Discuss how the coefficients on π_t and y_t in the optimal interest rate rule depend on the underlying parameters of the model. Discuss in particular whether the parameters reveal anything about the strict inflation-targeting preferences of the central bank.

QUESTION 3:

Employment and a flex-price money-in-the-utility-function model

Consider an infinite-horizon economy in discrete time, where the utility of the representative agent is given by

$$U = \sum_{t=0}^{\infty} \beta^t u(c_t, m_t, n_t), \quad 0 < \beta < 1, \quad (1)$$

with

$$u(c_t, m_t, n_t) \equiv b \ln c_t + (1 - b) (m^F \ln m_t - m_t) + \Psi \ln(1 - n_t),$$

$$0 < b < 1, \quad \Psi > 0, \quad m^F > 0.$$

Agents maximize utility subject to the budget constraint

$$c_t + k_t + m_t = f(k_{t-1}, n_t) + \tau_t + (1 - \delta)k_{t-1} + \frac{1}{1 + \pi_t} m_{t-1}, \quad 0 < \delta < 1, \quad (2)$$

where c_t is consumption, m_t is real money balances at the end of period t , n_t is labor supply, k_{t-1} is physical capital, τ_t are monetary transfers from the government, and π_t is the inflation rate. Function f is defined as

$$f(k_{t-1}, n_t) = k_{t-1}^\alpha n_t^{1-\alpha}, \quad 0 < \alpha < 1.$$

- (i) Derive the relevant first-order conditions for optimal behavior. For this purpose set up the value function $V(a_t, k_{t-1}) = \max_{c_t, m_t, n_t} \{u(c_t, m_t, n_t) + \beta V(a_{t+1}, k_t)\}$ where

$$a_t \equiv \tau_t + \frac{1}{1 + \pi_t} m_{t-1}.$$

- (ii) Interpret the first-order conditions intuitively, and show that they can be combined (along with the expressions for the partial derivatives of the value function) into

$$u_c(c_t, m_t, n_t) = \beta R_t u_c(c_{t+1}, m_{t+1}, n_{t+1}), \quad (3)$$

$$\frac{u_m(c_t, m_t, n_t)}{u_c(c_t, m_t, n_t)} = \frac{i_t}{1 + i_t}, \quad (4)$$

$$-u_n(c_t, m_t, n_t) = u_c(c_t, m_t, n_t) f_n(k_{t-1}, n_t), \quad (5)$$

where $R_t \equiv f_k(k_{t-1}, n_t) + 1 - \delta = (1 + i_t) / (1 + \pi_{t+1})$ is the gross real interest rate, with i_t being the nominal interest rate.

- (iii) Using the functional forms for u and f , examine the properties of the steady state using (3), (4), and (5) together with the national account identity $c^{ss} = k^{ss\alpha} n^{ss^{1-\alpha}} - \delta k^{ss}$ (where superscript “ ss ” denote a steady-state value). Assess in particular whether monetary policy can affect employment or not, and explain the economic reasons.
- (iv) Characterize the monetary policy that maximizes the utility of the representative agent and find the corresponding optimal steady-state real balances. Explain the result intuitively.