Harvard University
Department of Economics

General Examination in Macroeconomic Theory

Fall 2005

PLEASE USE A SEPARATE BLUE BOOK FOR EACH PART AND WRITE THE QUESTION NUMBER ON THE FRONT OF THE BLUE BOOK.

PLEASE PUT YOUR EXAM NUMBER ON EACH BOOK.

PLEASE DO NOT WRITE YOUR NAME ON YOUR BLUE BOOKS.

For those taking the **GENERAL EXAM** in macroeconomic theory:

1. You have **FOUR** hours.

2. Answer **ALL QUESTIONS** in Parts I, II, III, IV, and V.

3. Time allotted for each part:

I.	40 minutes
II.	40 minutes
III.	40 minutes
IV.	60 minutes
V.	60 minutes

Questions for fall 2005 macro theory generals

Say whether each of the following statements is true, false or uncertain, and – most importantly – in each case indicate why:

1. The greater is the responsiveness of inflation to situations of excess aggregate demand (in other words, the steeper is the short-run Phillips curve), the stronger is the optimal response of monetary policy to aggregate supply shocks.

2. The more importance it places on maintaining output as close as possible to the full-employment level, compared to the importance it attaches to keeping inflation steady, the more rapidly a central bank that is following an inflation-targeting regime should optimally attempt to bring inflation back to the desired rate after some unexpected development has resulted in inflation that is either faster or slower than desired.

3. When conditions are such that there is no long-run trade-off that monetary policy can exploit between output and inflation (in other words, if aggregate supply behavior is consistent with the natural rate property), monetary policy still faces a long-run trade-off between the variability of output and the variability of inflation.

4. When investors are forward-looking, the expectation that the government will run a large budget deficit for some period of time beginning in the future causes inflation to be greater than it otherwise would be in the present, before the deficits have even occurred.

Fall General Exam

Alberto Alesina

Two questions: 40 minutes total

1. Discuss in what sense one needs both nominal and real rigidities to have meaningful non-neutrality of money. Please state clearly your definitions of both nominal and real rigidities.
2. "In the Fischer contract model monetary policy is not neutral only when contracts are fixed for two periods." Is this statement true, false, uncertain? Explain and be clear about what you mean with monetary non-neutrality.

Rogoff

1. Consider a stochastic two-country world, a two-period, one good, endowment economy, in which agents in the home country have utility function

$$U = \left(\frac{C_1^{1-\rho}}{1-\rho}\right) + E\left(\frac{\beta C_2^{1-\rho}}{1-\rho}\right).$$

and agents in the foreign country have utility function.

$$U = \left(\frac{(C_1^*)^{1-\rho^*}}{1-\rho^*}\right) + E\left(\frac{\beta^*(C_2^*)^{1-\rho^*}}{1-\rho^*}\right)$$

Note that Home and Foreign agents may differ in their rates of time preference and degree of risk aversion. Home income in the first period is given by Y, and in the second period by $Y(s)$, where s is the state of nature. Agents abroad receive income stream Y^* and $Y^*(s)$.

a. Assuming that there are complete state contingent markets in this global economy, what relationship does the model predict between home and foreign consumption growth rates?

b. Now suppose that in each country, there are two goods, one a homogenous internationally traded good, and the other a nontraded good (a good for which the costs of international trade are prohibitive.) Assume that the Home agent's period utility function is now given by

$$C_s = (C_i^N)^\alpha (C_i^T)^{1-\alpha}$$

and the foreign agents' period utility function is identical with the same α. In the case, assume for simplicity that $\beta = \beta^*$, and $\rho = \rho^*$. Now what relationship is there between consumption growth rates in the two countries?

2. Please give very short answers to the following two equally weighted questions; you can refer to models but no algebra is required.

a. Feldstein and Horioka noted that savings and investment are extremely highly correlated in cross-country regressions. Why is this a puzzle in a world of highly integrated capital markets and what are some possible explanations?

b. In recent years, net capital flows have been going from the developing world to rich countries, particularly the United States. How might a new growth model with a human capital externality explain this phenomenon? What about a model with credit market imperfections?

Fall General
2005

Instructor: David Laibson
Economics 2010d

Problem 1 (30 minutes; Growth Model): Consider a growth model with production function

$$y_t = k_t^{\alpha}.$$

Assume complete depreciation of capital, so the dynamic budget constraint is

$$k_{t+1} = k_t^{\alpha} - c_t,$$

where c_t is consumption. Suppose that the representative consumer has utility function

$$u(c) = \ln(c)$$

and an exponential discount function with discount factor β.

a. Write down the sequence problem for this economy.

b. Write down the Bellman equation for this economy.

c. Find the fixed point of the Bellman equation.

Problem 2 (30 minutes; True, False, or Partially True). Please explain whether the following statements are True, False, or Partially True. You will be graded on the quality of your *explanation.*

a. Ito's Lemma implies that second-order terms in the total differential of the value function vanish as $dt \to 0$.

b. If the wages of Microsoft workers rose 10% between 2005 and 2006, then the consumption of microsoft workers would also rise by 10%.

c. If an investment tax credit is anticipated before the tax credit starts, investment will rise above its steady state level before the tax credit starts. When the tax credit starts, investment will jump up even more.

Barro
Neoclassical growth model

Suppose that the production function takes a Cobb-Douglas form in capital, K, and labor, L:

$$Y = AK^{\alpha} \cdot L^{\beta},$$

where $A>0$ is constant; $\alpha>0$, $\beta>0$; and $\alpha+\beta=1$. There is no technological progress. Capital, K, depreciates at the constant rate $\delta>0$. Labor, L, is constant (no population growth). Capital per worker, $k \equiv K/L$, begins at the value $k(0)$. Assume that $k(0) < k^*$, where k^* is the steady-state capital per worker.

1. Consider the Ramsey-type formulation in which the representative consumer maximizes utility over an infinite horizon with a usual iso-elastic utility function. What conditions determine the time path of consumption per person, c? What conditions determine the steady-state values, k^* and c^*?

2. Define the saving rate, s. What condition determines the steady-state saving rate, s^*?

3. Describe the behavior of k and c during the transition from $k(0)$ to k^*. What is the transitional behavior of the real interest rate and the real wage rate?

4. How does the saving rate behave during the transition from $k(0)$ to k^*? Can the saving rate be constant? If so, is the model the same as the Solow model? Can the saving rate by hump-shaped (first rising and later falling as k increases)? What pattern for the saving rate is reasonable empirically?