HOWARD UNIVERSITY

DEPARTMENT OF ECONOMICS

CODE NUMBER---------- TOTAL NUMBER OF PAGES----------

January 17, 2018

COMPREHENSIVE EXAMINATION:

MACROECONOMIC THEORY/ Ph.D.

EXAMINERS:

1. **Dr. Mika Kato, Chairperson**
2. **Dr. Gerald Daniels**
3. **Dr. Gaminie Meepagala**

1. **The examination is scheduled between the hours: 9:30 a.m-1.00 pm**

   ALL STUDENTS ARE TO BE SEATED BY 9:15 a.m.
2. **YOU ARE REQUIRED TO ANSWER ONLY FIVE (5) QUESTIONS.**

   Any additional questions answered over the required number from each category will NOT receive credit.
3. **Correct answers to questions NOT asked will receive NO credit.**
4. **Be sure to write the Code Number assigned to you in the TOP LEFT HAND CORNER OF THIS SHEET AND ON EACH ANSWER SHEET. DO NOT WRITE YOUR NAME ON ANY SHEET OF THE EXAMINATION.**
5. **Begin each question on a new page. Number each page used in sequence. Write only on one side of the paper.**

6. **Write clearly and illustrate your answers with graphs whenever and wherever possible.**
7. **USE ONLY BLACK INK PENS.**
8. **At the end of the examination, please indicate the total number of pages being submitted in the space provided in the TOP RIGHT HAND CORNER of this sheet.**

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1. **Bring your pens, pencils, calculators and rulers.**
2. **No briefcases, book bags or sacks, no handbags larger than 10 x 6 of any form are to be brought into the examination room.**
3. **No books, notes or other study material are to be brought into the examination room.**
4. **During the Examination there is to be no communication between or amongst students for any purpose. All questions must be directed to and channeled through the faculty member conducting the examination.**
5. **Only the scrap paper provided by the proctor is to be used for the examination. Scrap paper should bear the code number assigned to each student, and be handed over to the proctor along with the examination.**
6. **Students are not expected to leave the examination room before completing their examination and turning it in to the proctor.**
7. **NO FOOD OR SMOKING is permitted in the examination room.**
8. **It is the student's responsibility to remove any coffee or water containers taken into the examination room.**
9. **NO CELL PHONES ARE ALLOWED.**
10. **EXAMINATION RESULTS WILL ONLY BE GIVEN TO STUDENTS WHO ARE REGISTERED.**

Revised 09/07/2004

CODE NUMBER_____

STUDENTS: PLEASE CIRCLE ONLY THE QUESTIONS ANSWERED AND PROVIDE THE PAGE NUMBERS.

QUESTIONS	PAGE NUMBERS
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PH.D. MACROECONOMIC THEORY
COMPREHENSIVE EXAMINATION SPRING 2018

ANSWER ANY FIVE (5) QUESTIONS.

1. Explain (a)-(f). You may use a simple model and/or a graph if appropriate.

(a) Intertemporal budget constraint.
(b) Adaptive expectation.
(c) Golden-rule level of capital.
(d) Horizontal innovation.
(e) Club convergence.
(f) Knowledge spillover.

2. Answer questions (a)-(c).

(a) Present and discuss the analytical framework of the neoclassical growth theory. What is the engine of growth and what is its main results with respect to convergence and long-run growth?
(b) What is the long-run effect of short-run growth-enhancing policies (such as an increase in the savings) in the neoclassical growth theory?
(c) Study and evaluate the different views why, or why not, fiscal policy can be used as stabilization policy. Refer to a) the Ricardian equivalence theorem, b) models of sustainability of public debt, c) the causes and effects of public deficits and debt.

3. Answer questions (a)-(c).

(a) What is the engine of growth in Romer (1990)'s product variety growth theory and in the Schumpeterian growth theory?
(b) Compare it to the element driving endogenous growth in the AK theory. What does this comparison imply in terms of pro-growth policy design in both settings?
(c) Both the product-variety and the Schumpeterian models predict scale effects, namely, that a larger population (a larger population of researchers) would predict faster growth. Is this prediction problematic? How would you empirically test this prediction?

4. Consider a model of aggregate supply (Y_t). Suppose that wages (W_t) are adjusted to make up for the previous period's price level (P_{t-1}) and suppose flexible prices and a competitive goods market. Thus the aggregate supply side of the economy is described by

$$W_t = AP_{t-1},\ A > 0.$$

$$Y_t = F(L_t),\ F'(L_t) > 0,\ F''(L_t) < 0$$

$$F'(L_t) = \frac{W_t}{P_t}$$

$$\pi_t \equiv \frac{P_t - P_{t-1}}{P_t}$$

Answer questions (a)-(c).

(a) Show that this economy has a positive relationship between employment L_t and inflation π_t.

(b) Discuss why a stable Phillips relationship is sometimes viewed as a critical support for the traditional Keynesian theory.

(c) In 1970s and 1980s, the Phillips relationship failed with no significant supply shock, and modern Keynesians developed the so-called expectation-augmented Phillips curve. Show a typical formulation of the expectation-augmented Phillips curve and discuss how it is different from the traditional Phillips relationship.

5. Given the following production function:

$$Q = F(K, L) = BK^{\alpha}L^{1-\alpha},$$

where $B > 0$ and $0 < \alpha < 1$ and with output Q divided between consumption and investment. The fraction of income devoted to investment is s, a constant, capital depreciates at the rate δ, and labor grow at a constant rate n. Answer questions (a)-(d).

(a) Write Q in an intensive (per capita) form, q.

(b) Find the equation that describes the evolution of the capital stock per unit of labor, k.

(c) Find the steady-state levels, k^* and q^*. Draw a diagram showing q, depreciation, and savings.

(d) If the population growth rate increases show what happens to the equilibrium consumption. You may use a diagram.

6. Consider a Central Bank (CB) whose objective is to minimize the social-welfare loss. Assume a quadratic social welfare loss function,

$$L = \frac{1}{2}(y - y^*)^2 + \frac{1}{2}a(\pi - \pi^*)^2,$$

and an expectation-augmented Phillips curve,

$$y = \bar{y} + b(\pi - \pi^e),$$

where y is the real output, $\bar{y}$ is the natural output, y^* is the target output ($y^* > \bar{y}$), π is the inflation, π^* is the target inflation, and π^e is the expected inflation.

Answer questions (a)-(d).

(a) How do you interpret the parameter *a* in the loss function? What does a larger value of *a* mean?
(b) Assume that the policy maker makes a biding commitment about inflation. Derive the policy maker's optimal response, the level of actual inflation, π, and the level of actual output, *y*, in the economy.
(c) Now assume that a policy can be set by discretion. Derive the policy maker's optimal response function, the level of inflation, π, and the level of output, y, in equilibrium.
(d) Show that a discretionary monetary policy leads to higher inflation without raising output and that if a policymaker puts more weight on output, that will give rise to more excessive inflation.

7. Suppose that the economy's production function is

$$Y = \sqrt{K}\sqrt{LA}$$

where *K* is capital, *L* is labor, and *A* is the state of technology.

Suppose that the saving rate (s) is equal to 6%, the rate of depreciation of capital (δ) is equal to 5%, the number of workers grow at 5% per year and the rate of technological progress is 4%. Answer questions (a) and (b).

(a) Find the steady state values of:
   i. capital stock per effective worker
   ii. output per effective worker
   iii. growth rate of output per effective worker
   iv. growth rate of output per worker
   v. growth rate of output
(b) Suppose that the saving rate increases. Study its short-run and the long-run effect on the *growth rate* of per-capita output.

8. Consider an economy described by

$$Y = E(Y, r, G, T) \qquad \textbf{(IS)}$$

$$r = r(Y, \pi) \qquad r_Y > 0, r_\pi > 0 \quad \textbf{(Taylor rule)}$$

Answer questions (a)-(c).

(a) Why it is said that Taylor rule is more realistic than the traditional LM as a description of money market.

(b) Derive the aggregate demand (AD) curve from the above model and show that the AD curve is negatively sloped.

(c) Analyze the effect of monetary expansion on the equilibrium output (i) in countries where the marginal propensity to consume is high *vs*. (ii) in countries where the marginal propensity to consume is low.