HOWARD UNIVERSITY

DEPARTMENT OF ECONOMICS

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

February 1, 2016

COMPREHENSIVE EXAMINATION:

MACROECONOMIC THEORY/ Ph.D.

EXAMINERS:

1. **Dr. Mika Kato, Chairperson**
2. **Dr. Kofi Kissi Dompere**
3. **Dr. Gerald Daniels**

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 2016

ANSWER ANY FIVE (5) QUESTIONS.

1. **Answer questions (a)-(f).**

   (a) Discuss the basic distinction and similarities between neoclassical Macroeconomist and Neo-Keynesian macroeconomists.
   (b) Discuss the distinction and similarities between partial and general equilibrium analysis.
   (c) Discuss the Neoclassical theory of distribution and show its strengths and weakness.
   (d) Distinguish between stock and flow variables. Are flow variables related to stock variables and how?
   (e) Define stock equilibrium and flow equilibrium. Discuss the differences between the two. Give examples of stock and flow variables and suggest their uses in macroeconomic analysis in both macro-statics and macro-dynamics.
   (f) Discuss the differences, and similarities if any, between the Phillips Curve and Okun's Law.

2. **Take the Cobb-Douglass production function $q = k^{\alpha}$ where $q \equiv Q/L$, $k \equiv K/L$, and α is a distributive share under perfect competitive markets. Answers questions (a)-(c).**

   (a) Show that the profit ρ and wage w are $\rho = \alpha\left(\frac{q}{k}\right)$ and $w = (1-\alpha)q$, given by k.
   (b) Illustrate the result that ρ is given in terms of w by technical conditions by showing that in this case:$\rho = \alpha\left(\frac{1-\alpha}{w}\right)^{(1-\alpha)/\alpha}$.
   (c) Show that this economic system is closed under income distribution.

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

   (a) Explain the differences and similarities of substitution and non-substitution theories of investment in plants and equipment.
   (b) Select one of the class of the theories and select one theory from within the class and then outline the structure of the theory. Make sure to indicate the class of investment theories that your selection belongs. Please give an illustrative diagrammatic example with the logic of isoquant.
   (c) Indicate any empirical evidence of the theory that you have selected.

4. **Assume that the production function is of Cobb-Douglass form where $Q = \sqrt{KL}$ in the neoclassical growth process where Q is output, K is capital, and L is labor. Assume that the saving rate is $s = 0.1$ and labor force growth rate is $n = 0.025$ (that is 2.5% per year). Answer questions (a) and (b).**

   (a) With your understanding of the neoclassical growth theory, show that the steady-state growth path for all the aggregate variables are $Q = 4L_0e^{0.025t}$ and $K = 16L_0e^{0.025t}$.
   (b) From the result in (a), generalize for the Cobb-Douglass production function of the form $Q = K^{\alpha}L^{1-\alpha}$.

5. **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, a is the relative importance between inflation and output, and π^e is the expected inflation.

   Answer questions (a)-(d).

   (a) Assume that the CB makes a binding commitment about inflation, i.e., the expected inflation always coincides with realized inflation,
   $$\pi = \pi^e.$$
   Derive the welfare-loss-minimizing inflation and the economy's real output in equilibrium.
   (b) Now assume that the CB can set a policy by discretion. Given the public's expectation of inflation, derive the CB's policy reaction that minimizes the social welfare loss.
   (c) Sooner the public learn about the CB's policy derived in (b). Then in equilibrium, the public's expected inflation and the actual inflation should be equal,
   $$\pi = \pi^e.$$
   Derive the equilibrium inflation and output of the economy.
   (d) By comparing the equilibrium inflation and output derived in (a) in the case of binding commitment and those derived in (c) in the case of discretionary monetary policy, discuss a dynamic inconsistency problem.

6. 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.

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 16%, the rate of depreciation of capital (δ) is equal to 10%, the number of workers grow at 2% 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.