AFRICAN ECONOMIC RESEARCH CONSORTIUM

Collaborative PhD Programme in Economics for Sub-Saharan Africa

COMPREHENSIVE EXAMINATIONS IN CORE AND ELECTIVE FIELDS
JANUARY 28 – FEBRUARY 17, 2020

MACROECONOMICS

Time: 08:00 – 11:00 GMT   **Date: Tuesday, January 28, 2020**

INSTRUCTIONS:

1. Answer a total of FOUR questions: ONE question from Section A, ONE question from Section B, and TWO questions from Section C.

2. The sections are weighted as indicated on the paper.

SECTION A: (15%)

Answer only ONE Question from this Section

Question 1

(a)   Using IS-LM diagrams of a closed economy, briefly explain:

   (i)   the effects of an increase taxes on output and interest rate;   and   **[5 Marks]**

   (ii)   the effects of an increase in money supply on output and interest rate.   **[5 Marks]**

(b)   Explain the difference between GDP deflator and Consumer price index.   **[5 Marks]**

Question 2

In your home country, consumers spend (consume) according to the equation

$$C = 200 + 0.8(Y - T).$$

Investment is 600, government expenditure is 500, exports are 300, imports are 400, and taxes are fixed at 500.

(a)   Find the equilibrium level of GDP.   **[5 Marks]**

(b)   Assume that full employment output, Y= 6,000. Based on the results obtained in (a) calculate the deflationary or inflationary gap.   **[1 Mark]**

(c)   Now suppose the neighbouring countries increase their demand for your home country exports from 300 to 425. Find the new equilibrium level of GDP. Is there a deflationary or inflationary gap?   **[5 Marks]**

(d)   What is the value of the expenditure multiplier?   **[4 Marks]**

SECTION B: (25%)

Answer only ONE Question from this Section

Question 3

Consider a Solow growth model. Assume that both labour and capital are paid their marginal products. Let w denote $\partial F(K, AL)/\partial L$ and r denote $[\partial F(K, AL)/\partial K] - \delta$.

(a) Show that the marginal product of labour, w, is $A[\partial f(k) - kf'(k)]$

[7 Marks]

(b) Assume that both capital and labour are paid their marginal products, show that under constant returns to scale $wL + rK = F(K, AL) - \delta K$ **[8 Marks]**

(c) The return to capital, r, is roughly constant over time, as are the shares of output going to capital and labour. Does a Solow economy on a balanced growth path exhibit these properties? What are the growth rates of w and r on a balanced growth path?

[10 Marks]

Question 4

Consider the problem of a firm in an efficiency wage model. Effective units of labour are denoted as $E = e(w)L$. and the production function is $Y = F(E)$.

(a) What are the choice variables of the firm in the efficiency wage model? What does this imply about the nature of the labour market and the nature of the jobs on offer?

[6 Marks]

(b) Derive and interpret the optimality conditions of the firm's hiring decision.

[10 Marks]

(c) Assume that a national calamity destroys a big part of the national stock of capital. What will be the response of the labour market?   **[5 Marks]**

(d) What will be the effects of benefits and opportunities on the effort function?

[4 Marks]

SECTION C: (60%)

Answer TWO Questions from this Section

Question 5

(a) Discuss three important strategic modelling choices made in typical Dynamic Stochastic General Equilibrium (DSGE) models in characterizing business cycle activity.
[15 Marks]

(b) A simple New Keynesian DSGE model of business cycles consists of three key relationships. State each of the relationships and briefly describe what they characterize.
[15 Marks]

Question 6

Consider a Tabellini-Alesina-type model of strategic debt accumulation in which the utility function of the period-1 policymaker is specified as $V_{t=1} = \alpha_1 U(H_1) + (1-\alpha_1)U(R_1) + \pi\alpha_1 U(H_2) + (1-\pi)(1-\alpha_1)U(R_2)$. The parameter α can only take on the values 0 and 1. When $\alpha = 1$ all resources are spent on public good H and nothing is spent on public good R, and when $\alpha = 0$ all resources are spent on R. The country's initial wealth is W. The objective of period-1 policymakers is that if there is a chance for period-2 policymaker to be different, it may want to restrain its spending. Further, you are informed that the Ricardian Equivalence hypothesis holds [Hints: $H_1 + R_1 = W + D_1$ (period-1 budget constraint); $H_2 + R_2 = W - D_1$ (period-2 budget constraint); D_1 denotes debt stock in period-1; π stands for the probability that all resources are spent on H; and $(1-\pi)$ represents the probability that the policymaker will spend all resources on R].

(a) Explain how the preferences of the policymaker are determined using the Median Voter Theorem. **[5 Marks]**

(b) Describe what the first two and the last two terms of the period-1 policymaker's preference function capture. **[5 Marks]**

(c) Assume that $\alpha_1 = 1$. Find the first-order conditions for the period-1 policymaker's choice of D_1 and derive the value of π. **[5 Marks]**

(d) Use the result of part (c) to explain the implication for debt accumulation when $\pi = 1$. **[5 Marks]**

(e) What is the implication for debt accumulation when $0 < \pi < 1$? **[5 Marks]**

(f) Suppose $\alpha_1 = 0$. What is the first-order condition for the period-1 policymaker's most preferred value of D_1 when $\pi = 1$? **[5 Marks]**

Question 7

Suppose the costs of adjustment exhibit constant returns in $\overset{g}{k}$ and k. Specifically, suppose they are given by $C(\dot{k}/k)k$, where $C(0)=0, C'(0)=0$, $C''(\overset{g}{)} > 0$. In addition, suppose capital depreciates at rate δ; thus $\dot{k}(t) = I(t) - \delta k(t)$. Consider the representative firm's maximization problem.

(a) What is the current-value Hamiltonian? **[6 Marks]**

(b) Find the three conditions that characterize optimal behaviour. **[6 Marks]**

(c) Show that the condition implies that the growth rate of each firm's capital stock, and thus the growth rate of the aggregate capital stock, is determined by q. In (K, q) space, determine the $\overset{g}{K} = 0$ locus? **[6 Marks]**

(d) Substitute your result in part (c) to express $\overset{g}{q}$ in terms of K and q. **[6 Marks]**

(e) In (K, q) space, what is the slope of the $\overset{g}{q} = 0$ locus at the point where $q = 1$? **[6 Marks]**

Question 8

(a) What are the advantages and disadvantages of an inflation rate of 3% compared to zero inflation rate per annum? Would you advocate the replacement of the inflation target by a price level target? **[5 Marks]**

(b) How can a central bank diagnose the kind of shock that has disturbed the economy? **[5 Marks]**

(c) Compare the response of an inflation-targeting central bank to a permanent negative aggregate supply shock with that of a permanent negative aggregate demand shock on output and Equilibrium Rate of Unemployment. **[5 Marks]**

(d) Suppose there are two regions of an economy, in one of which the WS curve (a curve, which shows the relationship between W/P and unemployment, u) is quite steep and in the other, the WS is quite flat. Explain what will give rise to such a situation. Compare the implications for inflation and unemployment of a common positive temporary aggregate demand shock. How should the central bank respond? **[5 Marks]**

(e) Write down a Taylor Rule in terms of the real interest rate. Holding the output gap constant, does a rise in inflation by x percentage points result in an increase in the nominal interest rate of more than, less than or by just x percentage points? Explain. **[5 Marks]**

(f) Explain what the following statement means: "a government that is determined to reduce inflation may have a problem in achieving this outcome because of a lack of credibility" **[5 Marks]**