AFRICAN ECONOMIC RESEARCH CONSORTIUM

Collaborative PhD Programme in Economics for Sub-Saharan Africa

COMPREHENSIVE EXAMINATIONS IN CORE AND ELECTIVE FIELDS
FEBRUARY 13 – MARCH 4, 2019

MACROECONOMICS

Time: 08:00 – 11:00 GMT   **Date: Wednesday, February 13, 2019**

INSTRUCTIONS:

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

The sections are weighted as indicated on the paper.

SECTION A: (15%)

Answer only ONE Question from this Section

Question 1

Answer each as **True, False, or Uncertain**, providing some explanation for your choice.

(a) A real depreciation always improves the trade balance.   **[3 marks]**

(b) An increase in exports (due for example to an increase in foreign output) increases imports.   **[3 marks]**

(c) Governments should avoid trade deficits as they always lead to an outflow of foreign capital account.   [**3 marks**]

(d) If domestic nominal interest rate and the expected exchange rate are both fixed, and the domestic and foreign nominal interest rate will create expectations of an appreciation in the domestic currency.   **[3 marks]**

(e) In an open economy, monetary policy affects the demand for domestic goods through investment and interest rate parity condition.   [**3 marks**]

Question 2

Briefly explain the short run and long run Phillips curves   **[15 marks]**

SECTION B: (25%)
Answer only ONE Question from this Section

Question 3

State and prove each of these two hypotheses:

(a) The Ricardian Equivalence Hypothesis;   **[13 marks]**

(b) The Permanent Income Hypothesis.   **[12 marks]**

Question 4

Suppose a policymaker is in office for two periods. Output is given by $y = y^n + b(\pi - \pi^e)$, $b > 0$ each period. There are two possible types of policymaker, type 1 and type 2. A type-1 policymaker, which occurs with probability p, maximizes social welfare, which for simplicity is given by $(y_1 - \frac{a}{2}\pi_1^2) + (y_2 - \frac{a}{2}\pi_2^2)$, $a > 0$ [where y_1 is output of type-1 policymaker and y_2 is the output of type-2 policymaker]. A type-2 policymaker, which occurs with probability (1 – p), cares only about inflation, and so sets inflation to zero in both periods. Assume $0 < p < ½$.

(a) What value of π_2 will a type-1 policymaker choose?   **[3 marks]**

(b) Consider a possible equilibrium where a type-1 policymaker always chooses $\pi_1 = 0$. In this situation, what is π_2^e if $\pi_1 = 0$? What value of π_1 does a type-1 policymaker chooses? What is the resulting level of social welfare over the two periods?   **[6 marks]**

(c) Consider a possible equilibrium where a type-1 policymaker always chooses $\pi_1 = 0$. In this situation, what is π_2^e if $\pi_1 = 0$? What is the resulting level of social welfare over the two periods?   **[6 marks]**

(d) In light of your answers to (b) and (c), what is the equilibrium? In what sense, if any, does concern about reputation lower average inflation in this environment?**[6 marks]**

(e) In qualitative terms, what form do you think the equilibrium would take if $1/2 < p < 1$? Why?   **[4 marks]**

SECTION C: (60%)

Answer TWO Questions from this Section,

Question 5

Suppose instantaneous utility function is of the constant-relative-risk-aversion form, $u(C_t) = C_t^{1-\theta}/(1-\theta), \theta > 1$.   Assume that the real interest rate, r, is constant but not necessarily equal to the discount rate, ρ.

(a) Find the Euler equation relating C_t to expectations concerning C_{t+1}.   **[5 marks]**

(b) Suppose that the log of income is distributed normally, and that as a result the log of C_{t+1} is distributed normally. Let σ^2 denote its variance conditional on information available at time t. Rewrite the expression in part (a) in terms of $\ln C_t$, $E_t[\ln C_{t+1}], \sigma^2$, and the parameters r, ρ, and θ. (Hint: If a variable x is distributed normally with mean μ and variance V, $E[e^x] = e^\mu e^{V/2}$.   **[10 marks]**

(c) Show that if r and σ^2 are constant over time, the result in part (b) implies that the log of consumption follows a random walk with drift: $\ln C_{t+1} = a + \ln C_t + u_{t+1}$, where u is white noise.   [**8 marks**]

(d) How do changes in each of r and σ^2 affect expected consumption growth, $E_t[\ln C_{t+1} - \ln C_t]$? Interpret the effect of σ^2 on expected consumption growth in light of the precautionary saving.   [**7 marks**]

Question 6

(a) In the last three decades, there has been increased emphasis on central bank independence, and transparency and accountability in the conduct of monetary policy. Briefly explain:

   (i) Central bank independence;   **[15 marks]**

   (ii) Transparency and accountability of the central bank.   **[5 marks]**

(b) Briefly explain the balance sheet channel of monetary transmission.   **[10 marks]**

Question 7

In the context of *New Growth Theory*, suppose we have an explicit production function that includes human capital and is expressed as follows:

$$Y_t = K_t^\alpha [A_t H_t]^{(1-\alpha)}$$

where $H_t = L_t G(E)$ and L_t is the number of workers, $G(E)$ is the amount of human capital per labour and E is the average education level of current workers. Assume that the amount of human capital per labour is an increasing function of the average education level of current workers expressed as follows:

$$\frac{\partial G(E)}{\partial E} > 0:$$

The equation of motion for capital stock is:

$$\dot{K_t} = sY_t - \delta K_t,$$

and the dynamics of technological progress and labour are:

$$\dot{A_t} = gA_t, \ \dot{L_t} = nL_t:$$

Capital per effective labour is:

$$k_t = \frac{K_t}{A_t H_t}:$$

(a) Derive the dynamics of capital per effective labour inclusive of human capital.

[10 marks]

(b) Determine the output per effective labour **[8 marks]**

(c) Along the balanced growth path, what is the effect an increase in the average education level on output per person? Explain your answer and provide a reasonable outline of the net effect on the level of output per person due to an increase in the average education level [Use N as population]. **[12 marks]**

Question 8

Consider Search with part and full-time jobs model with the following assumptions:

- Time: Discrete, infinite horizon
- Demography: Single worker who lives for ever
- Preferences: The worker is risk-neutral (i.e. $u(x) = x$) and discounts the future at the rate r.
- Endowments:
  - While employed the worker gets a flow utility from leisure of $b > 0$.
  - Regardless of her employment status, each period with probability α_p she gets an offer a part-time job that pays w_p. Or, with probability α_f she gets a full-time job offer with wage w_f. Assume that $w_f > w_p$ and that $w_f > b$. With probability $1 - \alpha_p - \alpha_f$, she gets no offer.
  - In addition to job offers, an employed worker can lose her job. The probability that this happens is λ. (Assume that $\alpha_p + \alpha_f + \lambda < 1$.)

(a) Write out the asset valuation equations for each $V_u, V_p,$ and V_f (the value of being unemployed, part-time employed and full-time employed, respectively), in terms of each other. (Note: you can assume that $V_f > V_p$, so that full time employees ignore offers of part-time jobs.) **[6 marks]**

(b) Solve for the value of w_p at which workers are just indifferent between part-time employment and unemployment. (You do not need to solve all the value functions.) **[6 marks]**

(c) Now suppose instead that while employed part-time, workers get full-time job offers at the rate $\alpha_e \neq \alpha_f$. (Assume that $\alpha_p + \alpha_e + \lambda < 1$.). Write the value functions to reflect this change. **[6 marks]**

(d) Based on (c) how do the relative sizes of α_e and α_f affect the value of w_p at which workers are just indifferent between part-time employment and unemployment? **[6 marks]**

(e) Explain your answer to part (d). **[6 marks]**