



AFRICAN ECONOMIC RESEARCH CONSORTIUM

Collaborative PhD Programme in Economics for Sub-Saharan Africa

COMPREHENSIVE EXAMINATIONS IN CORE AND ELECTIVE FIELDS

FEBRUARY 11 – MARCH 2, 2015

MACROECONOMICS

Time: 08:00 – 11:00 GMT

Date: Wednesday, February 11, 2015

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

Using the IS-LM model, determine the impact of each of the following on stock prices.

- (i) An expansionary monetary policy; [6 marks]
- (ii) An unexpected increase in consumer spending assuming that the central bank:
 - (a) pursues accommodating monetary policy [3 marks]
 - (b) maintains the same monetary policy [3 marks]
 - (c) reduces money supply [3 marks]

Question 2

Suppose that the economy has the Phillips curve

$$\rho_t = \rho_t^e - 0.5(u_t - 0.06)$$

- (i) What is the natural rate of unemployment (u^n)? [5 marks]
- (ii) Use Phillips curve diagram to illustrate graphically how the inflation rate (π) and unemployment rate (u) change in the short run to an *unexpected expansionary* monetary policy. [5 marks]
- (iii) Use Phillips curve diagram to illustrate graphically how the inflation rate (π) and unemployment rate (u) change in the short run to an *expected expansionary* monetary policy. [5 marks]



SECTION B: (25%)

Answer only ONE Question from this Section

Question 3

Consider a model of investment in which the equation of motion for the market value of capital, q , is: $\dot{q}(t) = rq(t) - \pi(K(t))$, where $\pi'(\cdot) < 0$ and the equation for capital, K , is: $\dot{K}(t) = f(q(t))$ where $f(q) = NC^{q-1}$ with $f(1) = 0$ and $f'(\cdot) > 0$; and N is the total number of firms. Describe the effects of each of the following changes on the $\dot{K} = 0$ and $\dot{q} = 0$ loci, on K and q at the time of the change, and on their behaviour over time. In each case, assume that K and q are initially at their long-run equilibrium values.

- (i) A war destroys half of the capital stock; [7 marks]
- (ii) The government taxes returns from owning firms at rate τ [8 marks]
- (iii) A temporary increase in aggregate output following economic reforms [10 marks]

Question 4

- (i) Explain briefly the concept of permanent income hypothesis. [5 marks]
- (ii) Suppose real interest rate, r , and consumer discount rate, ρ , are non-zero. Assume further that instantaneous utility function takes the constant-relative-risk-aversion form, $u(C_t) = C_t^{1-\theta}/1-\theta$, where θ is the coefficient of relative-risk-aversion (i.e. the inverse of the elasticity of substitution between consumption at different dates). Show that once we allow for the possibility that the real interest rate and the discount rate are not equal, consumption needs not be a random walk. [10 marks]
- (iii) Investors are often concerned about possible losses that may arise from unforeseen developments in the financial markets, which arise mostly from information problems. What do you understand by the terms *adverse selection* and *moral hazard* as regards financial markets? [5 marks]
- (iv) How can issuers of bonds protect themselves against the negative financial implication of unpredicted declines in the interest rates? [5marks]



SECTION C: (60%)

Answer TWO Questions from this Section,

AT LEAST one of which MUST BE Question 5 or 6

Question 5

Consider a continuous-time optimal growth model in which the aggregate production function is of the form: $Y(t) = K(t)^\alpha (A(t)L(t))^{1-\alpha}$ where Y denotes output, K is the capital stock, L is the labour and A is labour-augmenting technology. Assume that L and A grow exogenously at rate n and a respectively. Capital depreciates at rate δ . The representative household in the economy has lifetime preferences given by:

$$\int_{t=0}^{\infty} e^{-\rho t} \left[\frac{\tilde{C}(t)^{1-\theta}}{1-\theta} \right] L(t),$$

where $\rho \in (0, 1)$, $\theta > 1$ and $\theta \neq 1$, and $\tilde{C}(t)$ is per capita consumption. In addition to households, a government exists which purchases $G(t)$ units of output. This amount is growing at the rate $n + a$ (i.e. the growth rate of government purchases is equal to the sum of the population growth rate and the growth rate of technology). Government purchases are financed via lump-sum taxes on households. Given this environment, do the following:

- (i) Solve the model as a social planner problem. Write down the associated present-value Hamiltonian and derive the necessary conditions. **[10 marks]**
- (ii) Define a steady-state equilibrium and derive the phase diagram associated with this economy. **[5 marks]**
- (iii) Suppose that, in period t_k the level of government purchases jumps unexpectedly to $G'(t_k) > G(t_k)$. This has no effect on the growth rate of government purchases. Describe the effect that this has on equilibrium (steady-state and any transition to a new steady-state) and use the phase diagram developed in (ii) to support your analysis. **[5 marks]**
- (iv) Suppose now that, in period t_m , the capital depreciation rate falls to $\delta' < \delta$. Again analyze the effect that this has on equilibrium (both transition and steady-state) using the phase diagram for this economy. Discuss the differences between your answer for (iii) and (iv). **[5 marks]**
- (v) Show that, in steady-state equilibrium, this model replicates Kaldor's stylized facts of growth. **[5 marks]**



Question 6

- (i) Suppose that money demand is given by $\ln\left(\frac{M}{P}\right) = a - bi + \ln Y$, and that Y is growing at rate g_Y . What rate of inflation leads to the highest path of seignorage? **[15 marks]**
- (ii) Suppose that instead of adjusting their real money holdings gradually toward the desired level, individuals adjust their expectation of inflation gradually toward actual inflation so that $m(t) = Ce^{-b\pi^e(t)}$ and $\dot{\pi}^e(t) = \beta[\pi(t) - \pi^e(t)]$, $0 < \beta > 1/b$. Find an expression for $\dot{\pi}^e(t)$ as a function of $\pi(t)$ **[15 marks]**

Question 7

Consider Search with part and full-time jobs

- 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 $\alpha_p + \alpha_f + \lambda < 1$.)
- (i) 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]**
- (ii) 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]**



- (iii) 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]**
- (iv) Based on (iii) above, 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]**
- (v) Explain your answer to part (iv). **[6 marks]**

Question 8

Inflation targeting is perhaps the most prominent intermediate monetary policy target today. Inflation targeting monetary framework does focus on only controlling inflation. Central banks in inflation targeting countries are also pre-occupied with moderating output volatility, minimizing large gyrations in interest rates, keeping the financial system stable, among others. In the literature, two dominant views of inflation targeting have emerged. The first is that inflation targeting is merely conservative window-dressing, while the second is that inflation targeting matters.

- (i) Give a clear explanation of inflation targeting. **[8 marks]**
- (ii) Explain three main pre-requisites for successful inflation targeting framework. **[15 marks]**
- (iii) Give two reasons that could hinder inflation targeting monetary policy in African countries. **[7 marks]**