MACROECONOMICS QUALIFYING EXAM
7007 Section

Required Question

Consider a two-equation endogenous stabilization model:

$\pi_t = \pi^e_{t|t-1} + y_t + \varepsilon_t$, Phillips curve

$\pi_t = \frac{1}{2}\left(\pi^e_{t|t-1} + \hat{\pi} + \varepsilon_t\right)$, president's policy rule

where the endogenous variables are:

π = inflation rate,

y = GDP gap;

and the exogenous variables are:

ε = a random price shock,

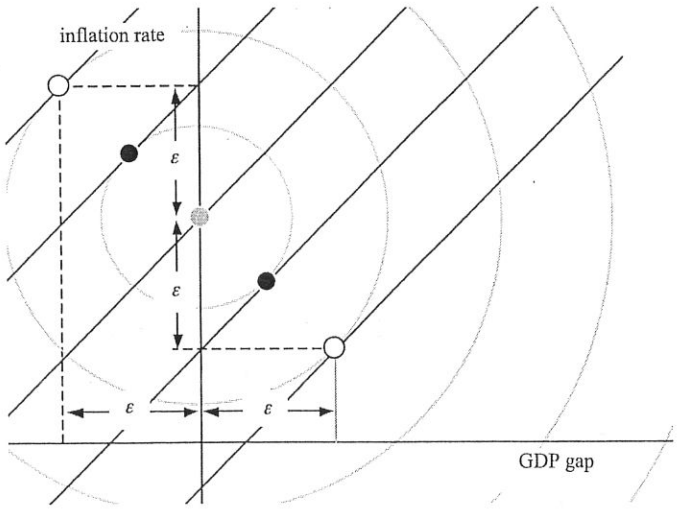
$\pi^e_{t|t-1}$ = expected inflation,

$\hat{\pi}$ = the president's inflation target, where $\hat{\pi} > 0$.

(a) Show that the policy rule above can be derived as a constrained optimization problem when the president's objective function is

$$U = -\frac{1}{2}\left((y_t)^2 + (\pi_t - \hat{\pi})^2\right)$$

Use the diagram below to illustrate your answer. You should label the unlabelled lines and points, add additional explanation and include it with your answer. Explain the logic of this model.



(b) Explain how an aggregate demand and supply theory is implicit in this model.

(c) Obtain the total differential of these equations. Write this linearized system as a matrix equation, ***Jdy=dx***, where ***J*** is the Jacobian matrix, ***dy*** a vector of endogenous partials and ***dx*** a vector of exogenous effects. What condition is necessary to insure that equilibrium exists? Is it satisfied?

(d) Evaluate the signs of $\frac{\partial \pi_t}{\partial \hat{\pi}}$ and $\frac{\partial y_t}{\partial \hat{\pi}}$. If possible, interpret the signs of your results. Illustrate your answer with a diagram.

(e) What is the long-run equilibrium of this model? Illustrate.

(f) Use the above diagram to explain the difference between the new-Keynesian and new-classical schools of thought. What assumption does each model make about the formation of expectations?

(g) Explain which school of thought is more effective with respect to macrostabilization according to the diagram.

Optional Questions
Answer two.

Question 1. Consider a simple macroeconomy:

$$\frac{w}{p} = F_N(K,N), \quad \text{labor demand,} \qquad F_{NK} < 0, F_{NN} < 0,$$

$$Y = F(K,N), \quad \text{production function,} \qquad F_K > 0, F_N > 0,$$

$$\frac{M}{p} = m(Y), \quad \text{money market equilibrium,} \quad m_Y > 0,$$

where Y, w and p are endogenous and K, N and M are exogenous. All variables are labeled as in Sargent.

(a) Obtain the total differential of these equations. Write this linearized system as a matrix equation, $\boldsymbol{Jdy=dx}$, where $\boldsymbol{J}$ is the Jacobian matrix, $\boldsymbol{dy}$ a vector of endogenous partials and $\boldsymbol{dx}$ a vector of exogenous effects. What condition is necessary to insure that equilibrium exists? Is it satisfied?

(b) Use the implicit function theorem to evaluate the signs of $\frac{\partial w}{\partial K}$ and $\frac{\partial Y}{\partial K}$. Interpret your results.

(c) Discuss whether this is a classical or Keynesian model. Does it exhibit neutrality? Dichotomy?

Question 2.

> The idea [is] that sustained high unemployment will gradually raise the natural rate of unemployment.... The intuition behind the claim emphasizes that high sustained unemployment decreases both the work and job-search skills of the unemployed at the same time that those who remained employed want to maintain wages at the expense of expanding employment....
>
> If [this] hysteresis does work in reverse, the current spell of low unemployment should help to generate a lower NAIRU [in the US] in the next few years.
>
> Joseph Stiglitz, "Reflections on the Natural Rate Hypothesis," **Journal of Economic Perspectives**, 1997.

(a) What is the meaning of the abbreviation "NAIRU?" What is the meaning of "hysteresis?"
(b) Formalize this argument into an equation, maybe several equations.
(c) Explain the logic of Stiglitz's prediction for the NAIRU in the US (dating from 1997). Apply the same logic to update his prediction to 2009.

Question 3. Consider a simple economy of N identical worker-investor-consumers. Each is endowed with 1 unit of labor power and nominal money m_o. Workers offer their labor to a single firm independently of the wage rate. The single firm produces a consumption good Y according to the production function

$$Y = \sqrt{(1-u)N},$$

where u is the unemployment rate. Taking the wage rate and price as given, the firm maximizes profit.

In their role as investors, all workers receive equal shares of the firm's profits,

$$\Pi = pY - wN,$$

where p is the price of the consumption good produced and w is the nominal wage.

In their role as consumers, everybody allocates their budgets between consumption c_i and real money balances $\left(\frac{m_i}{p}\right)$. Consumers face the budget constraint

$$\left(w + \frac{\Pi}{N}\right) + m_o = pc_i + m_i.$$

The consumption decision is made according to competitive assumptions; that is, consumers take w, p and Π as given.

Taxation is not permitted in this society, although positive government spending is. Equilibrium in the goods market is described by

$$Y = C + G = \sum_{i=1}^{N} c_i + G = N\left(\frac{3}{4}\left(\frac{Y}{N} + \frac{m_o}{p}\right)\right) + G.$$

The government controls the supply of nominal money so that equilibrium in the money market is given by

$$\frac{M}{p} = \sum_{i=1}^{N} \frac{m_i}{p} = N\left(\frac{1}{4}\left(\frac{Y}{N} + \frac{m_o}{p}\right)\right).$$

Assume that p, u, Y, C and G are endogenous, while w, M, m_o and N are exogenous.

(a) Explain why this particular aggregate consumption function is consistent an assumption that the consumers have a utility function of the form

$$U = \alpha \ln(c) + (1-\alpha)\ln\left(\frac{m}{p}\right).$$

What value does the parameter α take in this case? What is the *marginal propensity to consume*?

(b) Find the aggregate supply curve $Y = S(p)$. Show that this equation can be reinterpreted as a Phillips curve. Illustrate your answer.

(c) Explain why fiscal and monetary policies are not independent in this economy, but are effective.

Macroeconomics Qualifier
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Answer TWO questions of part A and ONE of part B.

Part A

1. Explain the concept of the supermultiplier, and explain the main difference with Cambridge equation models.

2. Explain the Kaleckian model of the cycle. How does it differ from Kaldor's model?

3. Contrast the notion of dynamic and structural instability.

Part B

4. Contrast the doctrine of sound finance and functional finance.

5. Explain the structuralist theory of inflation.