Required Question. (26 points) 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,

$$\Pi = pY - w(1-u)N$$

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 $\left(\dfrac{m_i}{p}\right)$. Employed consumers face the budget constraint

$$w + \frac{\Pi}{N} + m_o = pc_i + m_i.$$

Unemployed consumers do not earn wages, but still receive their profit share. Taxation is not permitted in this society, although government spending G is. The consumption decision is made according to competitive assumptions; that is, consumers take w, p and Π as given. Equilibrium in the goods market is described by

$$Y = \sum_{i=1}^{N} c_i + G = \frac{1}{2}\left(Y + \frac{M_o}{p}\right) + G.$$

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

$$M = \sum_{i=1}^{N} m_i = \frac{p}{2}\left(Y + \frac{M_o}{p}\right).$$

For parts (a), (b), (c) and (d), set $u=0$ and assume that p, w, Y and M are endogenous and that m_o, G and N are exogenous.

(a) Explain why the goods demand equation above 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) Discuss the assertion: *This model lacks microfoundations because it omits capital.*

(c) Explain why this model implies that, if the government spending G is exogenous, then the money supply M must be endogenous.

(d) Given that $m_o=1/10$, $G=0$ and $N=100$, find the equilibrium values for p, w, Y and M. Illustrate your answer.

For parts (d) and (e), now assume that p, u, Y and M are endogenous, while $w, m_o, G,$ and N are exogenous.

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

(f) Explain why fiscal policy effective in this economy. Illustrate your answer.

(g) Discuss whether these models are classical or Keynesian. Do they exhibit neutrality? Dichotomy?

Answer *two* of the *three* questions below.

Question 1.   (12 points)

> … Thus we can sometimes regard our ultimate independent variables as consisting of (1) the three fundamental psychological factors, namely, the psychological propensity to consume, the psychological attitude to liquidity and the psychological expectation of future yield from capital assets (2) the wage-unit as determined by bargains reached between employers and employed, and (3) the quantity of money as determined by the action of the central bank ….
>
> Keynes (1936: 247-8)

(a) Discuss the meaning of the term "independent variable."
(b) Relate this quote to Sargent's classical model. Use diagrams or equations as appropriate.
(c) Extend your discussion to Sargent's Keynesian model.

Question 2.   (12 points) Consider a two-equation endogenous stabilization model:

$$\pi = E\pi + x + \varepsilon \qquad \text{Phillips curve}$$

$$\pi = \frac{1}{2}\left(x^T + E\pi + \varepsilon\right) \qquad \text{government's policy rule}$$

where the endogenous variables are:
        π = the inflation rate,
        x = the GDP gap;
and the exogenous variables are:
        ε = a price shock,
        $E\pi$ = expected inflation,
 x^T = the government's output target.

(a) Discuss the logic of this model. Show that the government's policy rule can be derived as a constrained optimization problem when the government's objective function is

$$U = -\left(x_t - x^T\right)^2 - \pi_t^2$$

Illustrate your answer.

(b) Evaluate the signs of $\dfrac{\partial \pi_t}{\partial \pi_t^T}$ and $\dfrac{\partial x_t}{\partial \pi_t^T}$. Interpret your results. Illustrate your answer.

(c) What is the long-run equilibrium of this model?

Question 3.   (12 points) Consider the *IS-PC-MR* model drawn below.
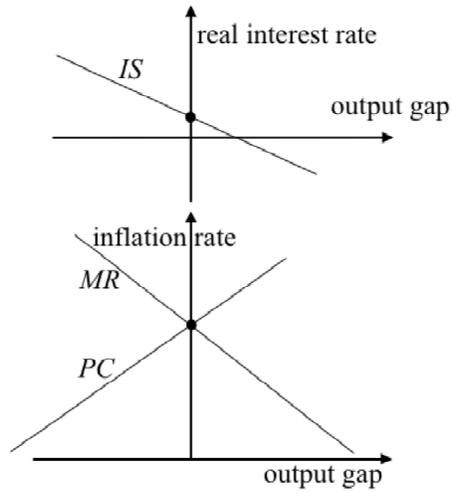
(a) Suppose that a recession is triggered by a shift in the *IS* curve. Use this model to describe how the equilibrium of this model evolves.

(b) Explain the logic of this model. Discuss whether this is a classical or Keynesian model.

Can a *deflationary trap* be illustrated in terms of these diagrams? A *liquidity trap*? Distinguish between these concepts?