

Midterm 2

Econ 381, Prof. Evans

Testing Center: March 18–20, 2009

INSTRUCTIONS:

- Please read each question below carefully, and respond to the questions on a separate sheet of scratch paper. You must show your work.
 - When finished with the test, staple your scratch paper with your answers and your work to this test when you turn it in.
 - You may use a testing center issued calculator.
 - This midterm consists of the following two sections that total 100 points possible:
 - Part 1: Short answer, 40 points possible
 - Part 2: Analytical problems, 60 points possible
 - Good luck.
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Part 1: Short answer

(40 points possible, 2 points each)

1. (Indicate the correct answer.) Most economists believe that prices are:
 - (a) flexible in the short run but many are sticky in the long run.
 - (b) flexible in the long run but many are sticky in the short run.
 - (c) sticky in both the short run and long run.
 - (d) flexible in both the short run and long run.
2. Give the definition of the IS curve for a closed economy.
3. Give the definition of the LM^w curve for a small open economy.
4. Define the $IS - LM$ equilibrium in a closed economy.
5. Give the definition of what a leading indicator is.
6. If the consumption function $C(\cdot)$ is given by $C = 200 + 0.75(Y - T)$, what is the government purchases multiplier dY/dG ?
7. If the consumption function $C(\cdot)$ is given by $C = 200 + 0.75(Y - T)$, what is the government taxes multiplier $-dY/dT$?
8. In a sticky wage model, what is the implied correlation between the real wage and output $corr\left(\frac{W}{P}, Y\right)$? Does this relationship hold in the data?
9. Does the Phillips curve relationship between inflation and unemployment hold in the data? Why or why not?

10. Give two examples of automatic stabilizers.
11. Define adaptive expectations.
12. Define the sacrifice ratio.
13. List which lag is longer—inside lag or outside lag— with regard to monetary policy M and fiscal policy G .
14. True or False. A balanced budget amendment would decrease the outside lag?
15. (Indicate the correct answer.) Historically, the primary cause of increases in U.S. government debt is:
 - (a) printing too much money.
 - (b) cutting taxes.
 - (c) increasing interest rates.
 - (d) financing wars.
16. Define the natural rate hypothesis.
17. (Indicate the correct answer.) Compared to the size of government debt as a percentage of GDP in other major industrial countries, the federal government of the United States:
 - (a) is one of the most heavily indebted governments.
 - (b) has accumulated a relatively small debt.
 - (c) has debt ranked about midway between the most and least heavily indebted governments.
 - (d) is one of the least indebted governments.
18. If an open economy wants to have independent monetary policy and free flow of capital, why can't that country have a fixed exchange rate?
19. If an open economy wants to have independent monetary policy and a fixed exchange rate, why can't that country have a free flow of capital?
20. Indicate all of the following characteristics that are necessary for aggregate demand shocks to have real effects in the short-run (move equilibrium Y around in the short run)?
 - (a) The short-run aggregate supply curve must be vertical.
 - (b) Individuals must be able to perfectly anticipate changes in the price level.
 - (c) Individuals must be able to be surprised sometimes by price changes.
 - (d) Expectations must not be perfectly rational.
 - (e) Expectations must be rational.

Part 2: Analytical problems

(60 points possible)

21. **SRAS, Okun's Law, and the Phillips curve (10 points):** Assume that the short-run aggregate supply equation is the following:

$$Y = \bar{Y} + \alpha(P - P^e) \quad \text{where } \alpha > 0$$

Further, suppose that Okun's Law proposes the following negative relationship between output and unemployment:

$$(Y - \bar{Y}) = -\beta(u - \bar{u}) \quad \text{where } \beta > 0$$

- (a) Use the short-run aggregate supply curve and Okun's Law to derive the Phillips curve (the relationship between inflation and unemployment).
- (b) What is the value for the sacrifice ratio in this economy?

22. **Sticky-price model (15 points):** Assume that short-run aggregate supply *SRAS* is determined by the sticky-price model in which one-fourth of the firms (0.25) in the economy have sticky prices, and three-fourths of the firms (0.75) have flexible prices. The sticky price firms set their prices \bar{p} according to the following equation:

$$\bar{p} = P^e$$

where P^e is the expected aggregate price level (overall prices). Notice that deviations of income from the natural level of income $Y - \bar{Y}$ do not factor into sticky-price firms' price setting because their expected level of income equals the natural rate $Y^e = \bar{Y}$. Flexible price firms set their price p according to the following equation:

$$p = P + 0.5(Y - \bar{Y})$$

where P is the aggregate (overall) price level. Aggregate prices P in the economy are simply a weighted average of the prices set by the sticky price firms \bar{p} and the flexible price firms p :

$$P = 0.25\bar{p} + 0.75p$$

- (a) Derive the short-run aggregate supply *SRAS* equation that results from this sticky-price model (i.e., aggregate output Y as a function of everything else).
- (b) What happens to the short-run aggregate supply *SRAS* equation if the fraction of sticky-price firms decreases from 0.25 to 0.10? Why? [Hint: Look at the slope of the *SRAS*.]
- (c) What happens to the short-run aggregate supply *SRAS* equation if the fraction of sticky-price firms increases from 0.25 to 0.50? Why?

23. **Rules versus Discretion (15 points):** Assume that the unemployment rate u_t in period t in an economy is given by the following equation:

$$u_t = \bar{u} - \alpha(\pi_t - \pi_t^e) \quad \text{where } \alpha > 0$$

where \bar{u} is the natural rate of unemployment, π_t is the inflation rate in period t , and π_t^e is expected inflation in period t . Assume that household's inflation expectations π_t^e are formed before actual inflation π_t is realized. Assume that the monetary authority in this economy can perfectly control the inflation rate π_t and chooses the inflation rate π_t that minimizes the following loss function in each period:

$$L_t(u_t, \pi_t) = u_t + \gamma\pi_t^2 \quad \text{where } \gamma > 0$$

In summary, the timing of this model is the following: (i) households form expectations about inflation π_t^e , (ii) the monetary authority chooses the actual level of inflation π_t , and (iii) the unemployment rate u_t is determined by the levels of actual inflation π_t and expected inflation π_t^e .

- (a) Derive the optimal inflation rate π_t for the monetary authority given any inflation expectations π_t^e . Call the expression for the optimal inflation rate under discretion π_t^d .
- (b) If households have rational expectations, what are the unemployment rate u_t and loss function $L(u_t, \pi_t)$ given π_t^d from part (a) and π_t^e from rational expectations? Call the loss function value under discretion L^d .
- (c) Assume that households have rational expectations and that a monetary policy rule takes the form $\pi_t^r = B$ where B is some constant between negative infinity and positive infinity. What range of values of B in the monetary policy rule $\pi_t^r = B$ would yield a loss function value less than or equal to the loss function under discretion L^d from part (b)?

24. **Big AD and AS general equilibrium system (20 points):** Assume that the short-run, equilibrium output and price combination (Y_{eq}, P_{eq}) in a small open economy is characterized by the point where the aggregate demand curve AD intersects the short-run aggregate supply curve $SRAS$.

Aggregate demand AD is determined by $IS - LM^w$ equilibrium. That is, aggregate demand is (Y, P) combinations consistent with market clearing in the goods market (IS^w) and in the money market (LM^w). The equilibrium equations for this economy are the following:

$$\begin{array}{ll} \bar{Y} = F(\bar{K}, \bar{L}) & \text{LRAS: Long-run aggregate supply} \\ Y = \bar{Y} + a(P - P^e) \quad a > 0 & \text{SRAS: Short-run aggregate supply} \\ Y = C(Y - T) + I(r^w) + G + NX(e) & \text{IS}^w: \text{ Goods market clearing} \\ \frac{M}{P} = L(r^w, Y) & \text{LM}^w: \text{ Money market clearing} \end{array}$$

- Suppose that a global recession causes the world interest to rise $r^w \uparrow$. What does this do to the IS^w curve?
- What would the increase in the world interest rate $r^w \uparrow$ do to the LM^w curve?
- What would the increase in the world interest rate $r^w \uparrow$ do to the equilibrium values of Y_{eq} and e_{eq} at which the goods market and the money market are in equilibrium?
- What would the increase in the world interest rate $r^w \uparrow$ do to the aggregate demand curve AD ?
- If the short-run aggregate supply curve is upward sloping as in the equation above, what is the effect of the increase in the world interest rate $r^w \uparrow$ on the equilibrium output level Y_{eq} and price level P_{eq} where aggregate demand AD equals short-run aggregate supply $SRAS$?
- If the monetary authority of this country were a fixed exchange rate regime, what would it have to do to the money supply M in order to keep the exchange rate e at its original level (the level before the increase in the world interest rate $r^w \uparrow$)?