

Midterm 2

Econ 381, Prof. Evans

Testing Center: November 12–14, 2008

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. Describe the main difference between the short-run and the long-run in the economic models that we have studied so far.
2. Give the definition of the IS^w curve for a small open economy.
3. Give the definition of the LM curve for a closed economy.
4. Define the $IS - LM$ equilibrium in a closed economy.
5. In the Mundell-Fleming model, what Keynesian assumption allows us to model net exports NX as a function of the nominal exchange rate e instead of the real exchange rate ε , such that $NX = NX(e)$?
6. List two leading indicators, which are the variables that tend to fluctuate in advance of the overall economy.
7. In general, what kind of shock causes a shift of the curve, and what kind of a shock causes a shift along the curve?
8. Derive the Phillips curve from the short-run aggregate supply curve (SRAS) and Okun's Law.
9. In a fixed exchange rate regime, what is the primary instrument that a policy maker uses to hold the nominal exchange rate fixed in the face of goods-market shocks and money-market shocks, and how does the policy maker use that instrument?

10. What is it called when a fixed exchange rate regime allows its fixed nominal exchange rate to go down $\bar{e} \downarrow$?
11. Define the concept of “the impossible trinity”.
12. What is the correlation between central bank independence and inflation? Is it positive or negative?.
13. Define rational expectations.
14. In the sticky-price model, what happens to the short-run aggregate supply (SRAS) curve as the percentage of sticky price firms s goes to zero $s \rightarrow 0$?
15. Which type of expectations is key to having an upward sloping (non-vertical) short-run aggregate supply (SRAS) curve? Why?
16. Define the sacrifice ratio.
17. List which lag is longer—inside lag or outside lag— with regard to monetary policy M and fiscal policy G .
18. What types of advancements or institutional changes might shorten the inside lag or the outside lag?
19. If you wanted to compare government debt levels across countries, what would be a good measure?
20. Define the concept of Ricardian equivalence.

Part 2: Analytical problems

(60 points possible)

21. **IS fiscal multipliers (10 points):** Assume that equilibrium in the goods market in a closed economy is characterized by the following relationship between actual expenditure/output/income Y , consumption C , taxes T , investment I , real interest rate on investment r , and government spending G .

$$Y = C(Y - T) + I(r) + G$$

Further assume that the exact form of the consumption function $C(\cdot)$ is the following:

$$C(Y - T) = 350 + 0.5(Y - T)$$

- Calculate the government purchases multiplier?
 - Calculate the government taxes multiplier?
 - What policy will have the biggest effect on output/income Y , an increase in G or a decrease in T ?
22. **Sticky-wage model (15 points):** Assume that short-run aggregate supply is determined by the sticky-wage model in which workers and firms bargain for a nominal wage W that is fixed for one period t .

$$\underbrace{W}_{\text{nominal wage}} = \underbrace{w}_{\text{target real wage}} \cdot \underbrace{P^e}_{\text{expected price}}$$

After W is set, and before labor L is hired, firms learn the aggregate price level P .

$$\underbrace{\frac{W}{P}}_{\text{real wage}} = \underbrace{w}_{\text{target real wage}} \cdot \underbrace{\frac{P^e}{P}}_{\text{expected/actual price}}$$

Assume that labor demand is a negative function of the real wage $L = L^d\left(\frac{W}{P}\right)$ and that output is an increasing function of labor $Y = F(L)$.

- Show that output Y is an increasing function of price P in the short-run while nominal wages W are fixed.
- What does the sticky-wage model say about the cyclical nature of the real wage $\frac{W}{P}$? In other words, is the correlation between the real wage and output $\text{corr}\left(\frac{W}{P}, Y\right)$ positive or negative?

23. **Big AD and AS general equilibrium system (15 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:

$\bar{Y} = F(\bar{K}, \bar{L})$	LRAS: Long-run aggregate supply
$Y = \bar{Y} + a(P - P^e) \quad a > 0$	SRAS: Short-run aggregate supply
$Y = C(Y - T) + I(r^w) + G + NX(e)$	IS^w : Goods market clearing
$\frac{M}{P} = L(i, Y)$	LM^w : Money market clearing
$i = r^w + \pi^e$	real and nominal interest rate

- (a) Show the effect of and the channel through which an increase in government spending $G \uparrow$ affects the equilibrium output, nominal exchange rate, and price level $\{Y_{eq}, e_{eq}, P_{eq}\}$ under a floating exchange rate regime.
- (b) Show the effect of and the channel through which an increase in government spending $G \uparrow$ affects the equilibrium output, nominal exchange rate, and price level $\{Y_{eq}, e_{eq}, P_{eq}\}$ under a fixed exchange rate regime.
- (c) If this small open economy were to impose a quota (limit) on imports of foreign automobiles into its country, show the effect of this policy on the equilibrium output, nominal exchange rate, and price level $\{Y_{eq}, e_{eq}, P_{eq}\}$ under a floating exchange rate regime.

24. **Time inconsistent policy problem (20 points):** Assume that the unemployment rate u 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 inflation expectations such that $\pi_t^e \neq \pi_t$, in general.
- (b) Assume that households have adaptive inflation expectations such that $\pi_t^e = \pi_{t-1}$. What is the incentive for the monetary authority in each period? Why do they do this?
- (c) Give a functional form for what rational expectations means in this model. That is, if agents know that monetary authority's loss function $L_t(u_t, \pi_t)$ what does rational expectations imply that expected inflation π_t^e is equal to?
- (d) If households have rational expectations, what is the optimal inflation rate set by the monetary authority? Why?
- (e) Would a rule in the charter of the central bank requiring it to maintain zero inflation $\pi = 0$ such that individuals could expect inflation to stay at zero $\pi_t^e = 0$ improve social welfare over the discretionary alternative studied in part (b)?