

Problem Set #7

Econ 381, Prof. Evans

Due Monday, Nov. 3, 4:30 p.m.

NOTE: You are encouraged to work on this problem set in a group of up to four members. When finished, each group should turn in one copy of the problem set to the class inbox in 130 FOB. Each completed problem set should list the names of the group members who worked on the assignment. As noted in the syllabus, no late assignments will be graded.

1. **Chapter 13, Sticky-price model (3 points):** Assume that aggregate supply is determined by the sticky-price model in which the fraction $s \in (0, 1)$ of the firms in the economy have sticky prices, and the fraction $1 - s$ of the firms 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 $Y - \bar{Y}$ don't 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:

$$p = P + a(Y - \bar{Y}) \quad a > 0$$

where P is the aggregate (overall) price level. Aggregate prices 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 :

$$P = s\bar{p} + (1 - s)p$$

- (a) Derive the aggregate supply equation that results from this sticky-price model (i.e., aggregate output Y as a function of everything else).
 - (b) What happens to the aggregate supply equation as the fraction of sticky-price firms goes to 0 ($s \rightarrow 0$)? Why? [Hint: Look at the slope.]
 - (c) What happens to the aggregate supply equation as the fraction of sticky-price firms goes to 1 ($s \rightarrow 1$)? Why?
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2. **Chapter 13, "Problems and Applications" (3 points): #3, #6**

3. **Chapter 13, Big AD and AS general equilibrium system (4 points):**

Assume that the equilibrium output and price combination (Y_{eq}, P_{eq}) in a closed economy is characterized by the point where the aggregate demand curve AD intersects the aggregate supply curve AS .

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

$$\bar{Y} = F(\bar{K}, \bar{L}) \quad \text{LRAS: Natural level of output}$$

$$Y = \bar{Y} + a(P - P^e) \quad a > 0 \quad \text{SRAS: Aggregate Supply}$$

$$Y = C(Y - T) + I(r) + G \quad \text{IS: Goods market clearing}$$

$$\frac{M}{P} = L(i, Y) \quad \text{LM: Money market clearing}$$

$$i = r + \pi^e \quad \text{real and nominal interest rate}$$

- (a) Show the effect of and the channel through which an increase in the money supply $M \uparrow$ affects the equilibrium output and price levels (Y_{eq}, P_{eq}) .
- (b) Show the effect of and the channel through which a surprise increase in the price level $P \uparrow$ affects the equilibrium output and price levels (Y_{eq}, P_{eq}) .