

Problem Set 4
Due: Wednesday, March 15

Question 1. Multiple Choice (10 points each) Provide a brief explanation.

1.1 Which of the following will shift the aggregate supply downward?

- a) An increase in foreigners' demand for domestic goods.
- b) An increase in productivity.
- c) A strengthening of unions.
- d) An increase in the labor force.
- e) (a) and (d).

1.2 In the aggregate demand relation, a rise in the price level causes output to drop through its impact on

- a) government spending.
- b) productivity.
- c) the real money supply.
- d) workers bargaining power.
- e) none of the above.

1.3 Which of the following would cause a consumer's human wealth to rise?

- a) Getting a Ph.D.
- b) A permanent increase in salary.
- c) Winning in the lottery \$ 1,000,000 per year for 20 years.
- d) (a) and (b).
- e) All of the above.

1.4 Consumption is more likely to respond one-for-one to changes in current income when

- a) people believe the change in their current income is temporary.
- b) the change in current income is caused by the business cycle.
- c) the change in current income results from a one-time bonus.
- d) people believe the change in their current income is permanent.
- e) they can borrow to smooth their consumption.

Question 2. Aggregate Supply/Aggregate Demand (40 points)

This problem deals with an open economy with no taxes, no government expenditure, and no investment. The marginal propensity to consume out of income c_0 is less than 1 and consumption C is a decreasing function of the interest rate i .

$$C = c_0 Y - c_1 i$$

Imports and exports depend on the "real exchange rate" E , namely, the price of domestic goods relative to foreign goods. Assuming the "exchange rate" and foreign prices are fixed, the relative price of domestic goods is simply the price level P .

$$E = P$$

Consumers spend part of their income on imports. If foreign goods are relatively cheap (i.e. E is high) consumers buy more imports.

$$Q = q_0 C + q_1 E$$

Foreigners buy domestic goods. If domestic goods are relatively cheap (low E means that domestic producers are competitive) exports are high.

$$X = x_0 - x_1 E$$

a) (7 points) Write down the equation for the IS curve. (Find Y as a function of i , P , and exogenous variables such that the goods market is in equilibrium.)

The money supply is fixed by the central bank at \bar{M} .

$$\left(\frac{M}{P}\right)^s = \bar{M}$$

As usually, money demand increases with output and decreases with interest rates.

$$\left(\frac{M}{P}\right)^d = m_0 Y - m_1 i$$

b) (7 points) Write down the equation for the LM curve. (Find Y as a function of i , P , and exogenous variables such that the money market is in equilibrium.)

c) (8 points) Write down the AD curve. (Find Y as a function of P and the exogenous variables such that both the goods market and the money market is in equilibrium.) Draw the IS, LM, and AD curves and show the effect of an increase in the price level P . Draw the IS and LM curves in the same graph (i vs. Y) and the AD curve in a separate one (P vs. Y). (You do not have values for the parameters, so just draw a simple illustration.)

The supply side of the economy is characterized simply by

$$Y^s = s_0 + s_1 * P.$$

Add the AS equation to the plot with AD. Consider the following scenarios, explain what changes in parameters they would be associated with, and describe (using the IS/LM and AS/AD graphs) what would happen to output, the price level and the interest rate.

- d) (6 points) Productivity increases.
- e) (6 points) The price of oil increases. (Assume q_0 , q_1 , x_0 , and x_1 are not affected.)
- f) (6 points) Consumers become more optimistic.

Question 3. Consumption (20 points)

Consider a consumer who lives for 2 periods. She receives wages W_1 in period 1 and $W_2 < W_1$ in period 2. She also starts with initial wealth K and does not want to leave anything after period 2. Interest rates are zero and the consumer wants to consume the same amount C in both periods (consumption smoothing). Let S be savings in period 1; namely, the amount of "money" that is carried over to afford consumption in period 2.

- a) (4 points) Find C and S .
- b) (4 points) Assume W_1 increases by ΔW but W_2 stays the same (temporary increase in income). Find ΔC and ΔS . What is the intuition?
- c) (4 points) Assume both W_1 and W_2 increase by ΔW (permanent increase in income). Find ΔC and ΔS . What is the intuition?
- d) (4 points) Assume W_2 increases by ΔW but W_1 stays the same (consumers become optimistic). Find ΔC and ΔS . What is the intuition?
- e) (4 points) Assume K drops by ΔK (stock market crash). Find ΔC and ΔS . What is the intuition?