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Economics 3334 – Intermediate Macroeconomics
Prof. Vollrath
Spring 2008

Midterm

There are 5 problems. Each has multiple parts. Each part may have one or two actual questions in it. Make sure you answer all of them. Within each problem the parts get harder as you go on, so manage your time accordingly.

1. (20 points) You have the following data on the economy:

	2005	2006
Quantity of Cheetos	100	150
Price of Cheetos	\$4	\$5
Quantity of Disney Princess Crap	100	200
Price of Disney Princess Crap	\$10	\$16

- a. (5 pts) Compute Nominal GDP in each year

$$NGDP_{2005} = 100(4) + 100(10) = \$1400$$

$$NGDP_{2006} = 150(5) + 200(16) = \cancel{6750} \$3950$$

- b. (5 pts) Compute Real GDP in each year using 2005 for the base year prices (Price of Cheetos = \$4 and price of Disney crap = \$10).

$$RGDP_{2005} = 100(4) + 100(10) = \$1400$$

$$RGDP_{2006} = 150(4) + 200(10) = \$2600$$

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- c. (5 pts) Compute the GDP deflator for each year. According to this are prices rising or falling?

$$\text{Deflator}_{2005} = \frac{\text{NGDP}_{2005}}{\text{RGDP}_{2005}} = \frac{1400}{1400} = 1$$

$$\text{Deflator}_{2006} = \frac{\text{NGDP}_{2006}}{\text{RGDP}_{2006}} = \frac{\$3950}{\$2600} = 1.52$$

- d. (5 pts) The Bureau of Labor Statistics has decided that the typical basket of goods in the country is 200 Cheetos and 150 pieces of Disney Princess Crap. Use this basket to compute the CPI for each year, with 2005 as the base year for prices (Price of Cheetos = \$4 and price of Disney crap = \$10).. According to the CPI are prices rising or falling?

$$\text{CPI}_{2005} = \frac{200(4) + 150(10)}{200(4) + 150(10)} = 1$$

$$\text{CPI}_{2006} = \frac{200(10) + 150(16)}{200(4) + 150(10)} = \frac{\$4400}{2300} = 1.91$$

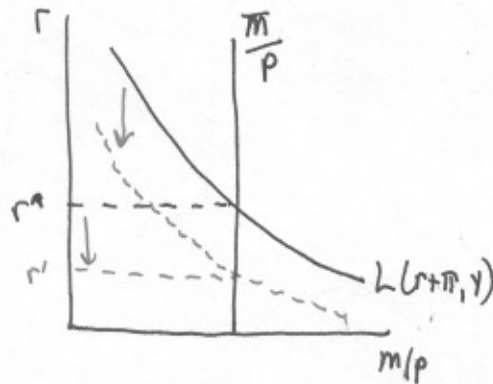
$$\text{CPI}_{2006} = \frac{200(5) + 150(16)}{200(4) + 150(10)} = \frac{3400}{2300} = 1.48$$

$$\begin{array}{r} 3150 \\ 16 \\ \hline 900 \\ 1500 \end{array}$$

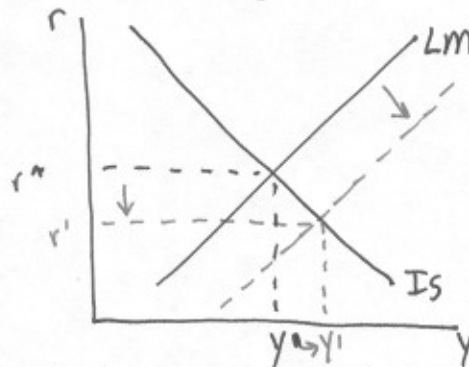
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2. (25 points) Consider a closed economy. Let's see what happens as the financial sector regains confidence.

a. (5 pts) First, draw the money market, and show the equilibrium real interest rate as r^* . Label the real money supply \bar{M}/P .



b. (4 pts) Now draw the IS/LM diagram with the equilibrium real interest rate of r^* and equilibrium output of Y^*



c. (5 pts) The subprime mortgage mess finally clears itself up, and banks now have lower demand for cash balances (the L function shifts). Show in the money market diagram in a) how this decrease in money demand affects the real interest rate.

r goes down

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- d. (4 pts) The change in money demand in the money market will affect the LM curve. Show in the diagram from b) how the LM curve shifts in response to the decrease in money demand. What happens to output?

Output goes up

- e. (4 pts) If the Federal Reserve didn't want output or the interest rate to change because of the decrease in money demand, what would they do to the money supply?

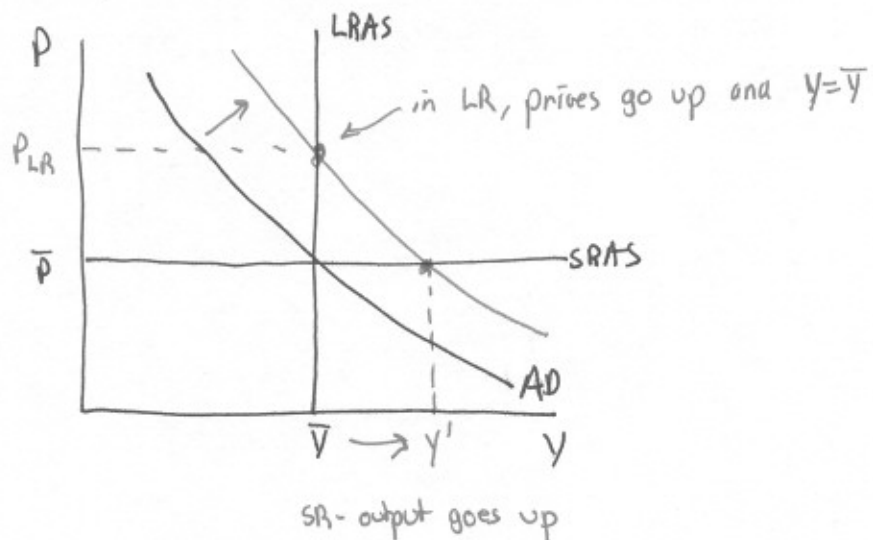
Lower money supply [by selling bonds].

This would shift the LM curve up, and offset the increase in Y and decrease in r

- f. (3 pts) If the Fed didn't do anything at all, what would happen to prices in the long run because of the decrease in money demand?

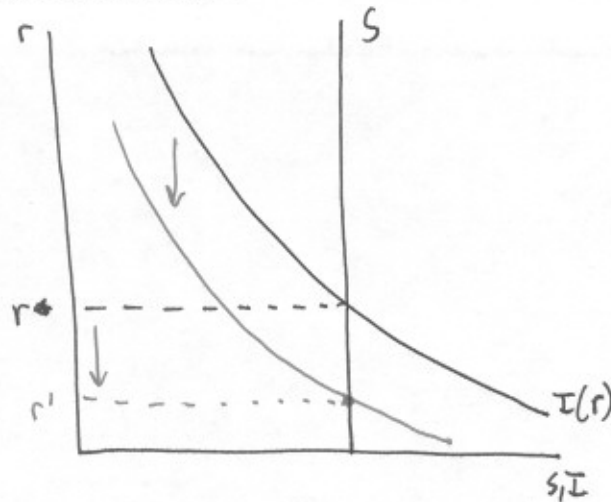
Prices, in the LR, would go up.

Why? Because the LM shift down raises output so the AD curve would shift up, and in the LR prices would have to rise

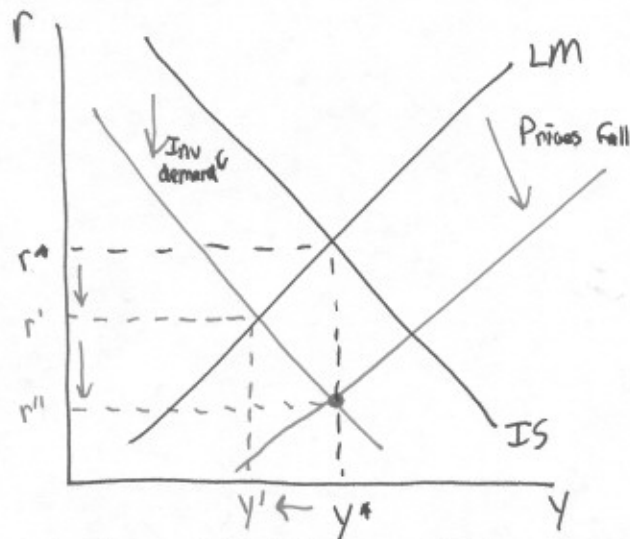


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3. (25 points) Consider the U.S. economy and one possible impact of more economic development in countries like China and Brazil.
- a. (4 points) Draw the loanable funds market for this economy and label the equilibrium interest rate r^* .



- b. (4 points) Draw the IS/LM diagram and label equilibrium output Y^* and the equilibrium interest rate r^* .



- c. (3 points) Now, businesses think that there are better opportunities to invest in Brazil and China. So they don't bother to invest very much in the U.S. Show in the loanable funds diagram from a) how a decrease in the investment demand function affects the equilibrium interest rate.

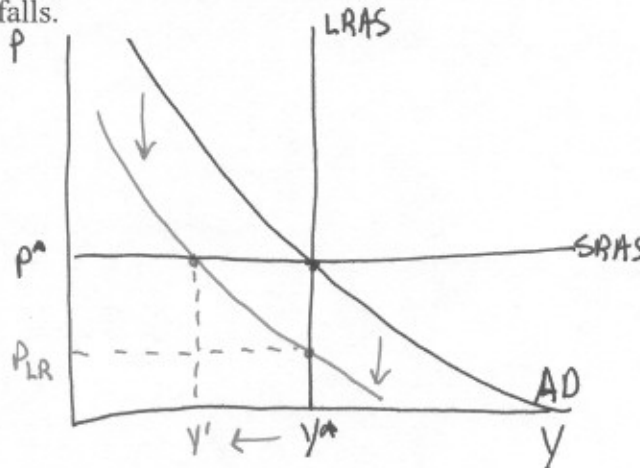
see diagram in a)

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- d. (3 points) Now show in the IS/LM diagram from b) how this decline in investment demand affects the IS curve. What happens to output and the interest rate?

Output falls and r falls

- e. (5 points) Now draw the AD/AS diagram, with an initial price level of P^* and output of Y^* . (Make sure you draw both the LRAS and SRAS). Show in this diagram what happens to the AD curve after investment demand falls.



- f. (2 points) What will happen to the price level in the long run in this economy?

Prices, in the LR would fall

- g. (2 points) Show in the IS/LM diagram from b) how the change in prices in the long run affects the LM curve. What happens to output and the interest rate?

LM curve shifts down.
 Output goes back to Y^*
 r falls even further

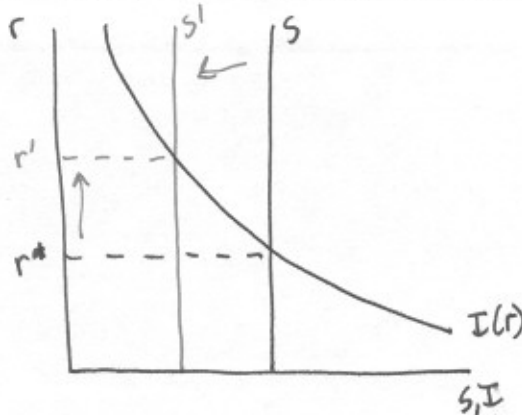
- h. (2 points) What would you predict would happen to the price of bonds (and for that matter, stocks) in this economy in the long run?

As $r \downarrow$, the price of bonds would rise
 [Stocks, by the way, work similarly to bonds, so
 this would be good for stock prices]

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4. (20 points) Think about what the tax refunds that just passed Congress will do to the economy.

a. (3 points) Draw the loanable fund market. Label the equilibrium interest rate r^* .



b. (3 points) Show how a decrease in taxes will impact the loanable funds market in a). What happens to the interest rate?

if $T \downarrow$ then what happens?

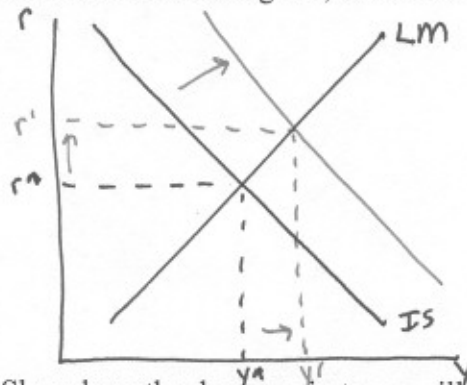
Savings go down.

$$S = Y - C - G$$

$$= Y - MPC(Y - T) - G$$

$$= Y[1 - MPC] + MPC(T) - G \quad \text{so if } T \downarrow \quad S \downarrow \quad r \uparrow$$

c. (3 points) Draw the IS/LM diagram, and label Y^* and r^* .



d. (3 points) Show how the decrease in taxes will change the IS/LM diagram. What happens to output and the interest rate?

Output and r both go up

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- e. (3 points) If I give you the following information about the economy, derive an equation for the IS curve. In other words, give me an equation for Y in terms of r:

- i. $C = 200 + 0.75(Y-T)$
- ii. $I = 200 - 25r$
- iii. $G = T = 100$

$$\begin{aligned}
 Y &= C + I + G \\
 Y &= 200 + .75(Y-T) + 200 - 25r + 100 \\
 &= 200 + .75Y - .75(100) + 200 - 25r + 100 \\
 Y[1-.75] &= 500 - 75 - 25r \\
 Y &= \frac{425}{1-.75} - \frac{25r}{1-.75} \\
 Y &= \frac{425}{1/4} - \frac{25r}{1/4} \\
 \boxed{Y} &= \boxed{1700 - 100r}
 \end{aligned}$$

- f. (3 points) If the equation for the LM curve is given below, use your answer from e) to solve for the equilibrium output Y^* and interest rate r^* .

- i. LM: $Y = 500 + 100r$

$$\begin{aligned}
 \text{IS: } Y &= 1700 - 100r & 500 + 100r &= 1700 - 100r \\
 & & 200r &= 1200 \\
 & & \boxed{r^*} &= \boxed{6}
 \end{aligned}$$

if $r^* = 6$ then

$$Y = 500 + 100(6)$$

$$\boxed{Y^* = 1100}$$

- g. (2 points) If taxes fall to 80, now what is the equilibrium output Y^* and interest rate r^* ?

$$\text{Now } Y = 200 + .75(Y-80) + 200 - 25r + 100$$

$$Y[1-.75] = 500 - .75(80) - 25r$$

$$Y(1/4) = 440 - 25r$$

$$\text{IS } \boxed{Y = 1760 - 100r}$$

$$\text{w/ LM } \boxed{Y = 500 + 100r}$$

$$1760 - 100r = 500 + 100r$$

$$1260 = 200r$$

$$\boxed{6.3 = r^*}$$

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so

$$Y^* = 500 + 100(6.3)$$

$$\boxed{Y^* = 1130}$$

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5. (10 points) The Fed is responsible for controlling the money supply to achieve stability.
- a. (3 points) What is the equation relating the money supply (M) to the currency base (C)?

$$M = \frac{C}{rr}$$

- b. (4 points) Suppose the Fed wants to raise M. Describe what the Fed would do in the bond market to achieve this.

To raise M, the Fed would buy bonds. They pay cash for these, raising C. As C ↑, M ↑

- c. (4 points) If the Fed raises C from 100 to 200, but the reserve ratio goes up from 5% to 10%, what happens to the money supply?

~~At the start~~ At the start $\bar{m} = \frac{100}{.05} = 2000$

After C ↑ and rr ↑ $\bar{m} = \frac{200}{.10} = 2000$

So there is no change in the money supply