Econ 362, Macroeconomic Theory, Hanes
Problem set on central banks setting *r* versus M^S

Consider an economy in the "short run," where the price level *P* remains fixed. You are on the central bank's policy committee. You meet once a month. The committee's goal is to keep output *Y* as close as possible to potential output $\overline{Y}$.

1) One strategy you could follow is to set the real interest rate *r* equal to a fixed value $\hat{r}$ for the entire month. If you set the real interest rate, there isn't an LM curve; the central bank staff just adjusts the money supply every day to keep $r = \hat{r}$; you can describe this on a graph by drawing a horizontal line at $\hat{r}$. When the committee meets to choose $\hat{r}$, you don't know exactly where the IS curve will be over the course of the month. You just have an estimate or forecast of where the IS curve will be. Your forecast IS curve is called IS^E. The actual IS curve is called IS^A. You choose the value for $\hat{r}$ so that *Y* will turn out to equal $\overline{Y}$ if your forecast for the IS curve turns out to be correct, that is if IS^A turns out to be the same as IS^E. But IS^A might turn out to be to the right of IS^E, or to the left of IS^E.
a) Draw a graph that shows IS^E, potential output $\overline{Y}$ (marked on the horizontal axis), and the value you will set for $\hat{r}$.
b) Draw a graph that shows what happens if the actual IS curve turns out to be to the left of IS^E. On the graph, show IS^E, IS^A, $\hat{r}$, $\overline{Y}$ and actual output Y^A. Is this a "recession" or a "boom"?

2) An alternative strategy you could follow is to set the money supply M^S equal to a fixed value $\hat{M}^S$ for the entire month. If you set the money supply, there is an LM curve. It position depends on the value for $\hat{M}$ that you chose. This LM curve is called $L\hat{M}$. You choose $\hat{M}^S$ so that $L\hat{M}$ is in the right position to make actual output Y^A equal $\overline{Y}$ if your forecast for the IS curve turns out to be correct.
a) Draw a graph that shows IS^E, potential output $\overline{Y}$ (marked on the horizontal axis), and $L\hat{M}$.
b) Draw a graph that shows what happens if the actual IS curve turns out to be to the left of IS^E. On the graph, show IS^E, IS^A, $L\hat{M}$, $\overline{Y}$ and actual output Y^A. **Make the horizontal distance between IS^E and IS^A exactly the same size as you did in the graph for 1)b).**
c) Compare your graph for 1) b) with your graph for 2) b). Is the difference between Y^A and $\overline{Y}$ bigger in 1)b), bigger in 2)b) or the same size in both cases? Given the goals of the policy committee, which strategy is better: setting *r* for the month, or setting M^S for the month? Or are the two strategies equally good?

3) Again suppose that you follow a strategy where you set M^S equal to a fixed value $\hat{M}^S$ for the entire month. But now suppose your forecasts for the IS curve are always accurate - that is, IS^A always turns out to be the same as IS^E. Call this IS curve $IS^{E=A}$. Also suppose that demand for real money balances is subject to "money demand shocks." That is, $(M/P)^D = eY - fi + \epsilon$ where ϵ can turn out to be zero (no shock), positive (extra high money demand), or negative (extra low money demand). Your best forecast for ϵ is zero. You set $\hat{M}^S$ based on this forecast. If ϵ actually turns out to be zero, the resulting LM curve will be in a particular position. Call this LM curve $L\hat{M}^E$. You choose $\hat{M}^S$ so that $L\hat{M}^E$ is in the right position to make actual output Y^A equal $\overline{Y}$. But ϵ might turn out to be positive or negative. If ϵ is positive or negative, the LM curve will not turn out to be where you wanted it to be. The actual LM curve, called LM^A, will be different from $L\hat{M}^E$. Thus, if ϵ turns out to be positive or negative, Y^A will not equal $\overline{Y}$.
Draw a graph that shows what happens if ϵ turns out to be positive. On the graph, show $IS^{E=A}$, $\overline{Y}$, $L\hat{M}^E$, LM^A and Y^A. State whether Y^A is bigger than $\overline{Y}$, smaller than $\overline{Y}$ or equal to $\overline{Y}$.

4) If you follow a strategy where you set *r* for the month (not M^S), money demand shocks have no effect on output, because there is effectively no LM curve - the interest rate remains equal to the chosen value $\hat{r}$ no matter what. Suppose the actual economy is as described in 3). That is, you can forecast the position of the IS curve perfectly, but there are money demand shocks that you cannot forecast. Given the goals of the policy committee, which strategy is better: setting *r* for the month, or setting M^S for the month?