Suggested Solutions to Problem Set 7

Question 1

The IS curve is \( Y = C_d + I_d + G = [600 + 0.8(Y - 1000) - 500r] + [400 - 500r] + 1000 \), so \( 0.2Y = 1200 - 1000r \). This is plotted below:

Since \( \pi^e = 0 \), the nominal interest rate \( (i) \) equals the real interest rate \( (r) \).

(a) Can the economy reach full employment? Since full-employment output is \( Y = 8000 \), for the economy to be on the IS curve, \( 0.2Y = 1200 - 1000r \), so \( (0.2 \times 8000) = 1200 - 1000r \), or \( 1000r = -400 \), so \( r = -0.4 \). But since the nominal interest rate can’t be negative, this isn’t possible. Thus, the requirement that \( i \) be non-negative means that there’s no way to satisfy the goods market equilibrium condition at full employment. Assuming that the result is that \( i = 0 \) and that output is determined along the IS curve means that \( 0.2Y = 1200 - (1000 \times 0) \), so \( Y = 6000 \). Note that this is the best result possible, no matter what the money supply is, so monetary policy can’t restore full employment.

(b) To restore full employment while the nominal interest rate is zero clearly requires a shift in the IS curve. If we return to the original derivation and put \( G \) in the equation instead of using the original value of \( G = 1000 \), we get:

\[ Y = C_d + I_d + G = [600 + 0.8(Y - 1000) - 500r] + [400 - 500r] + G, \] so 
\[ 0.2Y = 200 + G - 1000r. \] To get \( Y = 8000 \) and \( r = 0 \), we have \( 0.2 \times 8000 = 200 + G - (1000 \times 0) \), so \( G = 1400 \). Then the IS curve is \( 0.2Y = 1600 - 1000r \). This is plotted below as \( IS^2 \), while the original IS curve is \( IS^1 \).
Thus, raising $G$ to 1400 can generate full employment, if the money supply is chosen so that the $LM$ curve intersects the $IS$ curve at the right point. Note that taxes are 1000, so the government must run a large budget deficit.

What must the money supply be? Since $P/G^2$, we need money supply $M/P/G^3$ money demand $L$.

This situation is quite similar to the situation in Japan in the 1990s and suggests that to get out of the liquidity trap, Japan will need to use expansionary monetary policy, along with expansionary fiscal policy.

Question 2

In all figures, point A is the starting point, point B shows the short-run equilibrium after the change, and point C shows the long-run equilibrium after the change.

(a) In the figures below, the increase in tax incentives increases investment, shifting the $IS$ curve up and to the right from $IS^1$ to $IS^2$ in panel (a), and shifting the $AD$ curve from $AD^1$ to $AD^2$ in panel (b). The short-run equilibrium is at point B. Output increases, the real interest rate increases, employment increases, and the price level is unchanged.

To restore long-run equilibrium, the price level rises, shifting the $LM$ curve from $LM^1$ to $LM^2$ in panel (a), and the short-run aggregate supply curve from $SRAS^1$ to $SRAS^2$ in panel (b). The long-run equilibrium is at point C. Compared to the starting point, output is the same, the real interest rate is higher, employment is the same, and the price level is higher.
(b) In the figures below, the increase in tax incentives increases saving, shifting the IS curve from $IS^1$ to $IS^2$ in panel (a), and shifting the AD curve from $AD^1$ to $AD^2$ in panel (b). The short-run equilibrium is at point B. Output decreases, the real interest rate decreases, employment decreases, and the price level is unchanged.

To restore long-run equilibrium, the price level declines, shifting the LM curve from $LM^1$ to $LM^2$ in panel (a) and the short-run aggregate supply curve from $SRAS^1$ to $SRAS^2$ in panel (b). The long-run equilibrium is at point C. Compared to the starting point, output is the same, the real interest rate is lower, employment is the same, and the price level is lower.
(c) A wave of investor pessimism reduces investment. This shifts the IS curve down and to the left and the AD curve down and to the left, having the same result as in problem part (b).

(d) An increase in consumer confidence increases consumption spending, shifting the IS curve up and to the right and the AD curve up and to the right, with the same result as in problem part (a).

Question 3

All questions refer to the graph below.

(a) Initially, aggregate demand shifts from $AD^1$ to $AD^2$. Without the Fed’s intervention, the economy would move from point A to point B, where $AD^2$ intersects $SRAS^1$. Since prices are sticky, they would not adjust immediately, and the economy would stay for some time at point B, on the $SRAS^1$ curve. At this point, output is below the $LRAS$ line (below full employment), and the economy is in a recession. To bring the economy out of the recession, the Fed could pursue an expansionary monetary policy, which would shift aggregate demand from $AD^2$ back to $AD^1$. This would bring the economy back to point A, where output is at full-employment level.

(b) As before, aggregate demand shifts initially from $AD^1$ to $AD^2$. After six months, prices adjust, shifting short-run aggregate supply from $SRAS^1$ to $SRAS^2$. If, during this time, the Fed follows an expansionary monetary policy, this will shift (after six months) aggregate demand from
$AD^2$ back to $AD^1$. The economy will then be at the point where $AD^1$ intersects $SRAS^2$. At this point, output is above its full-employment level ($AD^1$ and $SRAS^2$ intersect to the right of $LRAS$). The Fed policy has "overshot" full employment. Since this increases the volatility of output, we see that in this case monetary policy can be destabilizing.

(c) If the Fed is able to forecast future recessions accurately, monetary policy will not be destabilizing. Assume, as before, that monetary policy takes six months to affect aggregate demand, and that price adjustment also takes six months. Then, if the Fed forecasts that aggregate demand will shift from $AD^1$ to $AD^2$ in six months, it can follow an expansionary monetary policy today, which will have an offsetting effect on aggregate demand (after six months). Hence, aggregate demand will not shift at all, and the economy will stay at point A, at full employment.

Finally, suppose that price adjustment takes a year rather than six months (and that monetary policy still takes six months to affect aggregate demand), and suppose that, as before, aggregate demand shifts initially from $AD^1$ to $AD^2$. The Fed can now pursue an expansionary monetary policy, which after six months will shift aggregate demand from $AD^2$ back to $AD^1$. Prices have not had time to adjust (as adjustment takes one year), so the economy is still on $SRAS^1$. Thus, the economy is back at point A, at full employment (and prices have not changed).

Question 4

Our data do not support the misperceptions theory. According to the misperceptions theory, unanticipated money growth should be negatively related to changes in unemployment. That is, when unanticipated money growth is positive, unemployment is expected to fall, and when unanticipated money growth is negative, unemployment is expected to increase. Out of the 16 years we analyze, only about half (9 years) behave according to this prediction. We conclude that, for this period, our data do not support the misperceptions theory.