1. Chapter 10, Problems and Applications (5 points): #3, #4

- #3
  (a) The decrease in the velocity of money can be represented in the AD/AS model as a shift in the AD curve down and to the left. In the short run, this results in a fall in output and no change in the price level. In the long run, the results is no change in output, but a fall in the price level. Thus, Fed A responds by not changing the money supply in the short run, but increasing $M$ in the long run (a shift out and to the right in AD). Conversely, Fed B increases $M$ in the short run (a shift out and to the right in AD), but keeps the money supply at its original level in the long run.
  
  (b) The oil price shock represents an upward shift in the SRAS curve. This results in a temporary increase in prices and a fall in output. Fed A does nothing, as there is no policy that will lower prices in the short run- it will have to wait it out until the long run where prices fall back to their original levels. Fed B will response by increasing the money supply, shifting the AD curve out and to the right and increasing output.

- #4
  - You can find this data by navigating to nber.org and going to “Data” and then “Business Cycle Dates”.
  - The latest turning point was in December 2007, when the economy entered the contraction that did not end until June 2009.
  - Recession dates during my life:
    * January 1980 - July 1980
    * July 1981 - November 1982
    * July 1990 - March 1991
    * March 2001 - November 2001
    * December 2007 - June 2009

2. Chapter 11, Problems and Applications (10 points): #2, #5

- #2
  (a) $E = C + I + G \implies E = 200 + 0.75(Y - T) + I + G \implies E = 200 + 0.75(Y - 100) + 100 + 100 \implies E = 325 + 0.75Y$. To draw this on a graph with $E$ on the vertical axis and $Y$ on the horizontal axis, you will have a straight line with a slope of 0.75.
  
  (b) In equilibrium, $Y = E$ (i.e. actual spending, $Y$, equals planned spending, $E$). That is, $Y = 325 + 0.75Y$. Solving this equation for $Y$ gives the equilibrium level of output; $Y^* = 1300$. On a graph this is the intersection of the curve drawn in part a and the 45 degree line.
(c) If \( G = 125 \), then \( E = 350 + 0.75Y \). In equilibrium, \( Y^* = 1400 \).
(d) To get \( Y^* = 1600 \), use the following equation that must hold in equilibrium:
\[
1600 = 225 + G + (0.75 \times 1600).
\]
Rewrite this to solve for \( G \):
\[
1600 = 225 + G + 1200 \implies 1600 = 1425 + G \implies 175 = G.
\]

• #5
(a) The money market can be drawn by putting the real interest rate, \( r \), on the vertical axis and real money balances, \( \frac{M}{P} \), on the horizontal axis. Draw the money supply curve as a vertical line at \( \frac{M}{P} = 500 \). The money demand function is drawn as a straight line with an intercept of 1000 and a slope of -100.
(b) The equilibrium interest rate can be found by setting supply equal to demand:
\[
1000 - 100r = 500 \implies -100r = -500 \implies r^* = 5.
\]
(c) In the money supply increases to 1200, then \( \frac{M}{P} = 600 \). Using the same condition as above:
\[
1000 - 100r = 600 \implies -100r = -400 \implies r^* = 4.
\]
(d) To find what amount of money results in an equilibrium interest rate of 7%, use the condition that supply must equal demand- \( \frac{M}{P} = 1000 - 100r \). Taking as given \( P = 2 \) and setting \( r = 7 \), solve for the \( M \) that makes the equation hold-
\[
\frac{M}{2} = 1000 - (100 \times 7) \implies \frac{M}{2} = 1000 - (700) \implies \frac{M}{2} = 300 \implies M = 600.
\]

3. Chapter 11, “Made up problem”- the Stimulus Package (10 points):
(a) Real GDP in 2009 was approximately $14.4 trillion (see the data in FRED).
(b) For this, use the government spending multiplier implied by an \( MPC \) of 0.8. The multiplier equals \( \frac{1}{(1-MPC)} = \frac{1}{(1-0.8)} = \frac{1}{0.2} = 5 \). To return GDP in 2009 to its “natural level” of $15.7 trillion, the government needs to spend enough to increase GDP by about $1.3 trillion. To find the size of stimulus necessary, recall that \( \Delta Y = \Delta G \times 5 \). Set \( \Delta Y = $1.3 \) and solve for \( G \) to find that \( G = $0.260 \) trillion (or $260 billion).
(c) Use \( \Delta Y = \Delta G \times 1.57 \) and as before set \( \Delta Y = $1.3 \) and solve for \( G \) to find that \( G = $0.83 \) trillion (or $830 billion).
(d) The stimulus package that was a part of the American Recovery and Reinvestment Act of 2009 included government spending totalling $509 billion and tax cuts totaling $287 billion - for a total of $787 billion in fiscal stimulus. Indeed, it appears the spending portion of the Act accurately reflects the estimated output gap (the difference between actual and GDP and its natural level) and government spending multiplier. You could also calculate the effect of the tax cuts on GDP (a common number for the tax multiplier is 0.99). What happens to the increase in GDP when this is included? Why do you think any tax cuts were included if Obama’s team thinks the multiplier on government spending is so much higher?

4. Chapter 12, Problems and Applications (15 points): #1, #3, #7
• #1
(a) An increase in the money supply \( (M \uparrow) \) is represented by rightward shift in the \( LM \) curve. The resulting equilibrium has a lower interest rate and a higher level of income.
(b) An increase in government purchases \((G \uparrow)\) is represented by a rightward shift in the \(IS\) curve by the amount \(\frac{\Delta G}{1-MPC}\). The resulting equilibrium has a higher interest rate and a higher level of income.

(c) An increase in taxes \((T \uparrow)\) is represented by a leftward shift in the \(IS\) curve by the amount \(-\frac{\Delta T \cdot MPC}{1-MPC}\). The resulting equilibrium has a lower interest rate and a lower level of income.

(d) If taxes increase by the same amount as government purchases (i.e. \(\Delta T = \Delta G\)), then the result is still a rightward shift in the \(IS\) curve. The \(IS\) curve shifts to the right by the amount \(\frac{\Delta G}{1-MPC} - \frac{\Delta T \cdot MPC}{1-MPC}\). Since \(\Delta G = \Delta T\), the net shift in the curve is \(\frac{\Delta G \cdot (1-MPC)}{1-MPC} = \Delta G\).

• #3

(a) The \(IS\) curve is drawn by connecting a straight line between the points \((900,8)\) and \((1700,0)\). The line has a slope of -0.01. You can draw this after solving for the \(IS\) curve using the consumption function, the investment function, and the general equation for the \(IS\) curve: \(Y = C(Y-T) + I(r) + G\). The resulting equation for the \(IS\) curve is \(r = 17 - 0.01Y\) or \(Y = 1700 - 100r\).

(b) The \(LM\) curve is drawn by connecting a straight line between the points \((500,0)\) and \((1300,8)\). The line has a slow of 0.01. You can draw this after solving for the \(LM\) curve using the money demand function and the general equation for the \(LM\) curve: \(\frac{M_P}{M} = (\frac{M}{P})_d\). The resulting equation for the \(LM\) curve is \(r = 0.01Y - 5\) or \(Y = 500 + 100r\).

(c) To find the equilibrium, solve the two equations (the \(IS\) curve and the \(LM\) curve) for the two unknowns \((Y \text{ and } r)\). The result is that \(Y = 1100\) and \(r = 6\).

(d) If government purchases increase by $50, the \(IS\) curve shifts to the right by $50 times the government spending multiplier. the government spending multiplier \(\frac{1}{(1-MPC)} = \frac{1}{(1-0.75)} = \frac{4}{0.25} = 4\). Thus the \(IS\) curve shifts to the right by $200. The new equation for the \(IS\) curve becomes \(Y = 1900 - 100r\). The new equilibrium is \(Y = 1200\) and \(r = 7\).

(e) If the money supply increases to 1200, there is a rightward shift in the \(LM\) curve. It moves to the right by $100. The new equation for the \(IS\) curve is \(Y = 600 + 100r\). The new equilibrium is \(Y = 1150\) and \(r = 5.5\).

(f) If the price level increases from 2 to 4, the \(LM\) curve shifts to the left by $250. The new \(LM\) curve is given by: \(Y = 250 + 100r\). The new equilibrium is \(Y = 975, r = 7.25\).

(g) The aggregate demand curve is downward sloping and goes through the points \((1000,4)\) and \((1100,2)\). Using the equations for the original \(IS\) curve \((Y = 1700 - 100r)\) and the original \(LM\) curve \((Y = \frac{1000}{P} + 100r)\), one can use the \(IS - LM\) equilibrium condition that both these be satisfied and solve for \(Y\) as a function of \(P\). The result is that \(AD\) is given by the following: \(Y = 850 + \frac{500}{P}\). An increase in government purchases, \(G\), or and increase in the money supply, \(M\), will shift the \(AD\) curve to the right. E.g. an increase in \(M\) from $1000 to $1200 makes the \(AD\) equation \(Y = 850 - \frac{500}{P}\).

• #7

(a) If all shocks are \(IS\) shocks (i.e. they all affect the demand for goods and services), keeping interest rates constant worsens recessions and inflates
booms because the “offsetting” effects of interest rates impacting investment demand are not present. Its better that $M$ be held constant.

(b) If all shocks at $LM$ shocks (i.e. they all affect the demand for money), keeping interest rates constant means that monetary policy moves to exactly offset the shocks (i.e. to shift the $LM$ curve back to its pre-shock location). Keeping $M$ fixed results in booms and busts.

5. Chapter 13, Problems and Applications (10 points): #1, #3

• #1

(a) A fall in consumer confidence can be represented by a leftward shift in the $IS^*$ curve. Under a floating exchange rate regime, there is no change in $Y$, there is a fall in $e$, and an increase in $NX(e)$. Under a fixed exchange rate regime, there is a fall in $Y$ and no change in $e$ or $NX(e)$.

(b) The new cars increase demand for Toyotas (an import) and thus shift the $NX(e)$ schedule to the left. The result is a leftward shift in the $IS^*$ curve. Under a floating exchange rate, there is not change in $Y$, a fall in $e$, and no change in $NX(e)$. Under a fixed exchange rate, there is a fall in $Y$, no change in $e$, and a fall in $NX(e)$.

(c) The reduction in the demand for money is represented by a rightward shift in the $LM^*$ curve. Under a floating exchange rate, there is an increase in $Y$, a decrease in $e$, and an increase in $NX(e)$. Under a fixed exchange rate, there is no change in $Y$, $e$, or $NX(e)$.

• #3

(a) A global financial crisis, making risk of default on loans higher. Generally, anything that will lowers world savings or increases world investment demand will increase the world interest rate.

(b) An increase in $r^*$ means a decrease in $I(r^*)$ and thus a shift to the left in the $IS^*$ curve. At the same time, the increase in $r^*$ means a decrease in $L(r^*, Y)$ and thus a shift to the right in the $LM^*$ curve. In a model with floating exchange rate, both of these forces push the exchange rate down. $Y$ falls because of the fall in $I(r^*)$, but some of this is made up for by the fall in exchange rates so that $NX(e)$, and thus $Y$, increase. The net effect is zero-$Y$ doesn’t change at all.

(c) With a fixed exchange rate, there is no change in $e$, and so no offsetting effect on $NX(e)$ (that is not increase in net exports to offset the fall in investment). Thus there is a fall in $Y$.

6. BONUS: Chapter 13, Problems and Applications (5 points): #7

• #7

(a) One can see that the $LM^*$ curve will slope upward using math: if $e \uparrow \implies P \downarrow \implies \frac{P}{\pi} \downarrow \implies \frac{M}{\pi} \uparrow \implies Y \uparrow$. Where the last relation comes from the fact that money demand must increase to meet supply, but $r$ is fixed at $r^*$. Thus as $e \uparrow$, $Y \uparrow$. In words, what is happening is that as $e \uparrow$ foreign goods get cheaper. Since people consumer foreign goods (i.e. $\lambda < 1$), this lowers the prices level that is relevant for the money market To keep the money market in equilibrium, income must rise to increase money demand as well.
(b) Expansionary fiscal policy increases $Y$, in contrast to the standard model where fiscal policy has no effect. The difference is due to the upward sloping $LM^*$ curve. This means that while an increase in $G$ causes the exchange rate to rise, it doesn’t rise as much as in the normal model. So $NX(e)$ falls, but not enough to offset the increase in $G$.

(c) The increase in the risk premia can be represented by a shift in the $LM^*$ curve to the right and a shift to the left in the $IS^*$. As in the standard model, $e$ falls, but it does not fall as much as in the standard model. The result is that $Y$ may fall or rise, but will not rise as much as in the standard model (because $e$ doesn’t fall as much, $NX(e)$ doesn’t rise as much). Also, since $e$ falls, the price level rises- this happens because as $e$ falls, foreign goods get more expensive and since people consumer foreign goods, the relevant price level increases. In the standard model, there would be no effect on the price level.