Assignment 2 - Answer Key

1. a) The real money demand is: $\frac{M^d}{P} = \frac{64^{\frac{1}{3}}}{\sqrt{16}\sqrt{0.5}} = 2$. The nominal money demand is:

$M^d = \frac{P \cdot 64^{\frac{1}{3}}}{\sqrt{16}\sqrt{0.5}} = 4$.

b) The velocity can be found by the quantity equation: $MV = PY$. Isolating V we find $V = 32$.

c) The income elasticity of real money demand is: $\frac{\partial(M^d/P)}{\partial Y}\frac{Y}{M^d/P} = \frac{1}{3}$.

d) Taking the growth rates $\Delta^{\%}M - \pi = \frac{1}{3} \cdot \Delta^{\%}Y - 0.5\Delta^{\%}\phi - 0.5\Delta^{\%}i$. So $\pi = 0.5\%$.

2. a) In the short-run the IS curve shifts up and to the right. Y and r increase so that the overall impact on C is ambiguous. The rise in the real interest rate decreases investment. In the long-run the LM curve shifts up and to the left to restore the general equilibrium at $IS' = LM' = FE$. Income is back to its full-employment level, the real interest rate rises even more so that investment is lower than in the short-run. Consumption is also lower than in the short-run (as both changes in Y and r have a negative impact here) but higher than its original value (since taxes and investement declined).

b) In the short-run the LM curve shifts down and to the right. Output increases and the real interest rate decreases. Consumption and investment increase. In the long-run, prices will increase and the LM shifts back to its original position. Both consumption and investment are back to their original values.

c) We will assume that the shock is temporary for simplicity. The FE curve shifts right. Eventually the prices will decrease and the LM will shifts down and to the right to restore the general equilibrium at $IS = LM' = FE'$. The real interest rate will be lower and output higher. Consumption and investment will increase.

3. a) According to the purchasing power parity: $e = 1$. One can use the definition of the real exchange rate to find out the nominal exchange rate: $e = \frac{e_{nom} \cdot P}{P_{for}}$. $e_{nom} = 1.25$.

b) According to the current and expected price levels, the expected inflation rates are: $\pi^e = 3\%$ and $\pi^e_{for} = -2\%$. Taking the growth rates from the definition of the real exchange rate: $\Delta^{\%} e = \Delta^{\%} e_{nom} + \pi^e - \pi^e_{for}$. With PPP holding: $\Delta^{\%} e = 0\%$. Hence $\Delta^{\%} e = -5\%$.

c) The nominal interest rate parity suggests that: $i + \Delta^{\%} e_{nom} \approx i_{for}$. Hence $i_{for} \approx 1\%$.

d) The real interest rate parity suggests that: $r^e + \Delta^{\%} e \approx r^e_{for}$. Here $\Delta^{\%} e = 0\%$ as PPP holds. Hence $r^e = i - \pi^e$ or $r^e_{for} = i_{for} - \pi^e_{for}$, for expected real interest rates of 3%.

4. a) The IS curve can be found by equating: $S^d = I^d$. Simplifying we get: $600r = 350 + C_0 - 0.5T - 0.5Y$. With $T = 200$, we get $600r = 250 + C_0 - 0.5Y$.

b) In the long-run $IS = FE$. Substituting $Y = 1000$ in the IS curve we find $r = 0.083$ and $C = 688$, $I = 112$. Using the LM curve we get $P = 2$ and the velocity is $V = \frac{PY}{M} = 20$.

c) The new IS curve is: $600r = 520 - 0.5Y$. Equating $IS' = LM$ we find that $r = 0.0666$, $Y = 960$, $C = 640.4$ and $I = 119.6$. Note that the equation $Y = C + I + G$ always holds.

d) If the government uses fiscal policy, the IS curve will shift back to its original position. The equation is (found in part a)): $600r = 350 + C_0 - 0.5T - 0.5Y$. Initially we had $C_0 = 300$ and $T = 200$. Now that $C_0 = 270$, T must be 140.

e) In the long-run $IS' = FE$. The new IS curve is: $600r = 520 - 0.5Y$. Equating $IS' = FE$ we find that $r = 0.0333$, $Y = 1000$, $C = 665.2$ and $I = 134.8$. Using the LM we get that $P = 1.76$ and the velocity is now $V = 17.6$.

5. a) The IS curve is $30r = 130 - 0.4Y$. At $Y = 175$, we have $r = 2$, $e = 2$. Using the LM curve with these values for r and Y, we get $P = 1.148$ and $e_{nom} = \frac{e \cdot P_{for}}{P} = 2.61$.

b) In the long-run prices will increase to compensate for the higher money supply and the LM curve will still be $\frac{M^d}{P} = Y - 20r$. With $Y = 175$, $r = 2$ and $M = 175$, P must be 1.263. As we are still at the general equilibrium $IS = LM = FE$, the real exchange rate is unchanged. The nominal exchange rate will depreciate to $e_{nom} = 2.375$.

c) The new IS curve is $30r = 160 - 0.4Y$. $IS' = FE$. $r = 3$, $e = 3$, $P = 1.35$ and $e_{nom} = 3.34$.