Economics 222
Assignment 4
Answer Key

1- a) The IS curve is: $775r = 331 - 0.3Y$. Equating $IS = FE = 1000$ we get: $r = 0.04$, $C = 600$, $I = 100$. The velocity is: $v = 8 + 50r = 10$ and using the LM curve, we get: $P = 1$. Note: $C + I + G = 1000 = Y$, always a good thing to verify at the end of your calculations.

b) The action here is the same as in the textbook, p.310-312, so refer to it for the intuition. Again using: $IS = FE'$, you will get: $r = 0.05$, $C = 580.412$, $I = 93.75$. The LM curve will shifts left to restore the general equilibrium. That will be done by having a price increase. Using the LM curve with $r = 0.05$, $M = 100$ and $Y = 974.16$, we get: $P = 1.0778$. The velocity was not constant during this episode: $v = 10.5$.

c) The new IS curve is: $775r = 207.25 - 0.3Y$. Using: $IS' = FE$ we get: $r = 0.03$. If the Central Bank do not want to see the prices change, it must increase the money supply (instead of waiting for the prices to decrease). Using the LM curve, you should find that: $M = 105.26$ reestablishes the real money balances at an equilibrium value. The LM curve will shifts right. We also have that: $v = 9.5$, $P = 1$, $C = 619.59$, $I = 106.25$ and $G = T = 274.16$. Again you can verify that: $C + I + G = 1000$.

2- a) Using the definition of the real exchange rate, we get $e_{\text{nom}} = 0.70$. Using the nominal interest rate parity we get: $\Delta\% e_{\text{nom}} \approx -4\%$. The future rate is: $e^f = 0.6736$.

b) The nominal rate turned out to be $e_{\text{nom}} = 0.68727$, for a percentage change of: -1.82%.

c) The exchange rate turned out to be higher than what we calculated using the interest parity condition. We can expect the interest rate parity condition to yield an unbiased estimate of the future exchange rate (i.e. an *ex-ante* unbiased prediction) , but not to predict with 100% accuracy what will be the exact value of the future rate (i.e. *ex-post* unforeseeable events might have happened, and the future value of the exchange rate might turn out to be different than the one predicted by the theory) .

3- a) The IS curve is: $r = 5 + \frac{G}{300} - \frac{0.4Y}{300}$. With $G = 300$ and $Y = 1500$, we get: $r = 4$, $e = 0.75$, $NX = 0$, $C = 860$, $I = 340$, $P = 1$ and $e_{\text{nom}} = 0.75$.

b) Use the new IS curve and the LM curve to get as short-run equilibrium values: $r = 4.4$, $e = 0.79$, $Y = 1575$, $NX = -95$, $C = 900$, $I = 320$, $G = 450$, $P = 1$ and $e_{\text{nom}} = 0.79$.

In the long run: $IS' = FE$. We have: $r = 4.5$, $e = 0.80$, $NX = -100$, $C = 835$ and $I = 315$. The LM curve will shifts to restore the general equilibrium: $P = 1.143$. This yields: $e_{\text{nom}} = 0.70$.

c) The IS curve shifts down now. Using $IS'' = LM$ we get: $r = 3.2$, $e = 0.77$, $Y = 1350$, $NX = -110$, $C = 780$, $I = 380$ and $e_{\text{nom}} = 0.77$ (recall that the prices are fixed in the short-run, so that $e = e_{\text{nom}}$).

The long-run equilibrium is given by: $IS'' = FE$. That is: $r = 3$, $e = 0.75$, $NX = -100$, $C = 910$ and $I = 390$. The prices must lower to restore the general equilibrium. Using the LM curve we get that: $P = 0.8$ and $e_{nom} = 0.9375$.