ECON 222

Macroeconomic Theory I

Fall Term 2009

Answers to Assignment 4

Question 1: IS-LM/AD-AS in an Closed Economy (10 Marks)

i) The investment curve would shift up to the left in the goods market. The equilibrium interest rate would increase. This would shift up the AD curve from AD1 to AD2 and the IS curve from IS1 to IS2. In the short run, we would be above full employment at point B with a higher interest rate but with P still equal to P1.

In the long run, firms will not produce above full employment so there will be upward pressure on prices, shifting the SRAS up until we reach point C. As prices increase, the real money supply shifts to the left from M/P1 to M/P2. This decrease in the real money supply increase the real interest rate since people try to get rid of bonds and acquire money, thereby decreasing the price of bonds and increase the real interest rate. This causes the LM curve to shift up to the left. This further increases the interest rate to r3. In the long run, output has not increased, the interest rate is at a higher level

ii) An increase in the money supply shifts the real money supply to the right in the asset market. This reduces the real interest rate since people want to trade in the excess money for bonds, the price of bonds declines, reducing the return on bonds. This shift the LM curve down to the right. Assuming that the Central Bank has increased the money supply by the correct amount, we will get back to full employment where the IS-LM-FE curves intersect. The increase in the money supply shifts the AD curve up to the right since the lower interest increases consumption and investment. We move to full employment where the SRAS-AD-LRAS curves intersect at the same price level as before but at a higher level of C and I.

Question 2: IS-LM in an Open-Economy (15 Marks)

(a) The IS curve:

$$\begin{aligned} Y &= C^d + I^d + G + NX \\ Y &= 200 + 0.69Y + 80 - 1000r + 20 + 85 - 0.09Y - 90 \\ Y &= 295 + 0.6Y - 1000r \\ Y &= 737.5 - 2500r \end{aligned}$$

The LM curve:

$$\begin{aligned} 115 &= 0.5Y - 200r \\ Y &= 230 + 400r \end{aligned}$$

In equilibrium $Y = \bar{Y}$, so $r = 0.175$.

(b) For a fixed exchange rate, the change would be along the IS curve, so that $r = r^*$.

$$\begin{aligned} Y &= 737.5 - 2500(0.225) \\ Y &= 175 \\ M &= 0.5 * 175 - 200(0.225) \\ M &= 42.5 \end{aligned}$$

(c) From the real interest rate parity: 1-This would be the answer if we assumed that there is some adjustment in the foreign exchange rate market, so that net exports adjust with some lag.

$$\begin{aligned} \frac{e}{e^f}(1 + r_{FOR}) &= 1 + r \\ 1.225\frac{e}{90} &= 1.175 \\ e &= 86.327 \end{aligned}$$

The value of Y can be found with a system of 3 equations (IS, LM and UIP) and 3 unknowns (Y, r and e). It is sufficient to answer this question by arguing that there is an increase in Y.

2- If we assume instead that even in the short run the exchange rate level would always be equal to the one forecasted ($e = e^f$) (people don't expect large variations), then the foreign and domestic interest rates don't differ and, in this case, the IS curve would shift up to $r' = r^{FOR}$ From the LM curve we can now find the new level of output.

$$\begin{aligned} Y &= 230 + 400(22.5) \\ Y &= 320 \end{aligned}$$

It will result in a new IS curve.

$$\begin{aligned} Y &= 962.5 - 2500r - 2.5e \\ 320 &= 962.5 - 562.5 - 2.5e \\ 80 &= 2.5e \\ e &= 32 \end{aligned}$$

(d) Regarding c), in the long-run, since output is above its full-employment level, prices must *increase*, causing the LM curve to shift upwards (leftwards). Hence, the real exchange increases (an appreciation of the domestic currency), which causes the NX to fall (X increase while M decrease), and the IS curve to shift in. The new interest rate parity is maintained.

Question 3: Foreign Investment (15 Marks)

a) Option 1) Cdn Investment \$100 CAD = \$105 CAD next period
Option 2) US investment \$100 CAD

i) Convert CAD to USD, get e_{nom} = \$85 USD

ii) Invest and get interest next period

$= (1 + .10)^{*}\$85 = \$93.5$ USD

$= (1 + i_{for})e_{nom}$

iii) Convert USD back to CAD

$= (1 + i_{for})e_{nom}/e^{f}_{nom}$

$= \$93.5US/0.925$

$= \$101.08CAD$

The expected return is higher on the Canadian asset, so this is the better investment based on your expectation of the exchange rate (5)

b) Option 1) is unchanged.
Option 2) for you Grandma is now:
US investment \$100 CAD

i) Convert CAD to USD, get e_{nom} = \$85 USD

ii) Invest and get interest next period=$\$85^{*}1.10 = \$93.5$ USD

$= (1 + i_{for})e_{nom}$

iii) Convert USD back to CAD

$= (i + i_{for})e_{nom}/e^{f}_{nom}$

$= \$93.5US/0.875$

$= \$106.86CAD$

Grandma would choose the US investment (5)

c) The answer requires applying the nominal interest rate parity condition. In equilibrium, these two option

must have the same expected pay-off or savers in the market alter their portfolio of asset holdings.
Option 1) Cdn investment $ 100 CAD = $ 105 CAD next year.
$= 100 * (1 + i)$
Option 2) US investment $100 CAD

i) Convert CAD to USD get $e_{nom} = 85$ USD

ii) Invest and get interest next period

$= 85^{*}1.10 =$ $93.5 USD

$= (1 + i_{for})e_{nom}$

iii) Convert USD back to CAD. What e^{f}_{nom} gives you the same expected return of $105 CAD?

Expected return from Option 1 = Expected return from Option 2

$\rightarrow \$105CAD = 100^{*}(1 + i) = 100^{*}(1 + i_{for})e_{nom}/e^{f}_{nom}$

$105CAD= 93.5US/e^{f}_{nom}$

$\rightarrow e^{f}_{nom} = 93.5/105 = .89$

The asset market participants appear to be expecting the CAD to be worth 89 US cents by the end of the period