New Economic School
Macroeconomics 2

Problem set 4 answer key

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November 29, 2004

1. **True, False, Uncertain. Explain your answer.**

   (a) **FALSE**. If private saving is sufficiently high, a budget deficit can exist simultaneously with a trade surplus, as is the case in Japan.

   (b) **FALSE**. The appreciation need not be painful, as expansionary fiscal or monetary policy can be combined with an apprecation to eliminate a trade surplus without changing equilibrium income.

   (c) **FALSE**. If exports and imports respond slowly to changes in relative prices, net exports will actually improve before the trade balance deteriorates. This is the j-curve.

2. **Fiscal coordination.**

   (a) $\begin{cases} Y = 10 + 0.6\,(Y - 10) + G + 0.1Y^* - Y/10 \\ Y^* = 5 + 0.3\,(Y^* - 10) + G^* + 0.1Y - Y^*/10 \end{cases} \Leftrightarrow \begin{cases} 0.5Y = 14 + 0.1Y^* \\ 0.8Y^* = 7 + 0.1Y \end{cases}$

   $\begin{cases} Y \approx 30.513 \\ Y^* \approx 12.564 \end{cases}$

   $$X - Q = 0.1\,(Y^* - Y) = 0.1\,(12.564 - 30.513) = -1.\,794\,9$$

   Since trade balances of the two countries add up to identical zero, $X^* - Q^* = 1.\,794\,9$.(points)

   (b) In equilibrium, country 1 perceives its output as $0.5Y = G + 4 + 0.1Y^* = G + 4 + 1.2564 = G + 5.2564 \Rightarrow Y = 2\,(G + 5.2564)$. To achieve $Y = 40$, $G = 14.\,744$.

   In the same fashion,

   $$Y^* = \frac{G^* + 2 + 0.1Y}{0.8} = \frac{G^* + 5.\,051\,3}{0.8}$$

   This gives desired spending at $G = 6.\,9487$.

(c) What if the governments could coordinate their actions? Would your answer to b) change?

Combine the two equations: $\begin{cases} 0.5Y = G + 4 + 0.1Y^* \\ 0.8Y^* = G^* + 2 + 0.1Y \end{cases}$. Setting $Y = 40$, $Y^* = 15$ gives the required spending levels at $G = 14.5$, $G^* = 6$. Both are lower than in b) because in coordinating their efforts, countries take into account positive influences on each other.

3. **Relaxing Mankiw's interest parity assumption.** Consider a small open economy, assuming now that there is also investment in both countries. Price levels are fixed in this model, so there is no difference between nominal and real exchange rate, denoted by e. Finally, international financial markets are open. The equilibrium conditions are given by

$$\begin{aligned} Y &= C(Y-T) + I(r) + G + NX(Y, Y^*, e) && (1) \\ M/P &= L(Y, r) && (2) \end{aligned}$$

(a) Use the uncovered interest parity condition (UIP): $1 + r - r^* \approx \dfrac{e_t}{e^e_{t+1}}$. Solving this in terms of e gives

$$e = e^e\,(1 + r - r^*) \qquad (3)$$

Substituting into (1):

$$Y = C\,(Y - T) + I\,(r) + G + NX\,(Y, Y^*, e^e\,(1 + r - r^*))$$

(b) As always, the tax cut shifts out the (modified) IS curve. This pushes up the interest rate r and increases output. Higher interest rate implies that e should go up (3). This is the appreciation of the currency. Intuitively, higher interest rates make the country attractive for foreign capital, increase the demand for domestic currency and strengthen the exchange rate. Investment goes down because of the interest rate. Net exports decrease due to both increase in Y (larger imports) and stronger currency (lower exports and larger imports).

Summary: $Y \uparrow$, $r \uparrow$, $e \uparrow$, $I \downarrow$, $NX \downarrow$. Appreciation has a dampening effect on the output because of the worsened trade balance.

(c) If exchange rates were fixed, $e^e = e$, so $r = r^*$ in equilibrium. That means that after the tax cut higher interest rate will cause capital inflow, which translates into increase in money supply under the specie flow mechanism exchange. This shifts the LM curve out until the interest rate declines back to the international level. The output will rise even more than under flexible regime, there will be no effect on r, no effect on e, no effect on investment, and slight worsening of the balance of payments (imports go up due to higher Y). In fact, the analysis of the lectures is unmodified.