Mankiw, chapter 12 problems
Mundell-Fleming model of a small open economy

Be sure you are acquainted with the case studies on the gold standard (346-7), devaluation in the depression (349), the Mexican and Asian financial crises (353-358), and the Chinese currency controversy (360-1).

**Problem 1. Mundell-Fleming analysis of same shocks as in problem 1 of chapter 5.**

**BASE MODEL** (as in chapter 5, I set $G = T = 0$ for a simpler story)

**IS:**

$$Y = C + I + NX$$

- $C = 0.75 Y$
- $I = 6000 / r$
- $NX = 5000 – 100 e$

**LM:**

$$Md = 3 Y / r$$

- Set initial money supply at 2000
- Set world interest rate at 6 percent.
- Set initial exchange rate at 5, so initially $NX = 0$

Hence

$$Y = .75 Y + 6000 / r + 5000 – 100 e$$

$$or \ Y = 24,000 / r + 20000 – 400 e$$

at $e = 50$ and $r = 6, Y = 4000$

**At $r = 6, Y = 4000$**

---

a. Fall in consumer confidence. Basic story: Shift backward in the IS curve, which would in a closed economy lead to a drop in $r$ and in $Y$. In a small open economy, with the world interest rate set at 6 percent, we would have a divergence between the income levels predicted by the IS curve and the LM curve.

The drop in domestic interest rates which would have happened in a closed economy will be prevented by a capital outflow as domestic residents will try to buy foreign bonds to take advantage of the expected-to-be-higher interest rates abroad.

In doing so, they will be trying to buy foreign currency with domestic currency: increasing the demand for foreign currency and tending to drive up its price.

Under floating rates, domestic currency depreciates, and as a result the IS curve will tend to shift out, and cancel the initial effect of the drop in consumer confidence.

Under fixed rates, the Central Bank will intervene to keep the value of the currency fixed, which means that the Central Bank is buying our own currency on foreign exchange markets and thus taking it out of circulation. Our money supply will contract, and the LM curve will shift to meet the new IS curve.

Interest rates will not fall, but $Y$ will.

In a closed economy, we could solve the IS-LM system to get $r = 4.7434$ and $Y = 3162.28$

In an open economy, model the drop in consumption by replacing the consumption function with

$$C = 0.6 Y$$

The IS curve will become:

$$Y = 0.6 Y + 6000 / r + 5000 – 100 e$$

or

$$Y = 15,000 / r + 12500 – 250 e$$

and if $r = 6, Y = 2500$.

But the LM curve still predicts that $Y = 4000$

Under the floating exchange rate system, the LM curve determines income for a small open economy:

$$Y = 4000 = 2500 + 12500 – 250 e,$$

so

$$12500 – 250 e = 1500 \text{ or } 250 e = 11,000 \text{ or } e = 44$$

with $e = 44, NX = 5000 – 4400 = 600$.

Under fixed rates, the money supply will contract to 1250, and as a result

$$1250 = 3 Y / 6 \text{ or } 1250 = 0.5 Y$$

or

$$Y = 2500$$
Problem 12.1 (continued)

b. New Toyotas lead to a shift in the net export function:
   model by setting the new \( NX = 4500 - 100 \, e \) (rather than \( 5000 - 100 \, e \))
This is graphically EXACTLY the same as part (a): The IS curve shifts back, and
whether or not its effects are offset by depreciation depends on whether we are under fixed or floating exchange
rates.

The new IS curve would be:
\[
Y = 0.75 \, Y + 6000 / r + 4500 - 100 \, e
\]
and with \( r = 6 \) and \( e = 50 \), we would have: \( Y = 0.75 \, Y + 1000 - 500 \) or \( Y = 2000 \).
If \( e \) dropped to 45, we would be at the original value for \( Y = 4000 \); this will happen under floating rates.

Under fixed rates, the money supply will contract so that \( Ms = 3 \, (2000) / 6 = 1000 \).

c. Drop in money demand due to ATMS:
   New money demand curve: \( Md = 2.5 \, Y / r \), so if \( Ms = 2000 \) and \( r = 6 \), \( Y = 12000 / 2.5 = 4800 \)
The IS curve still holds at \( Y = 4000 \) if \( r = 6 \), unless the currency depreciates.

The tendency of domestic interest rates to drop would lead to a capital outflow and a trade surplus, with a
currency depreciation (as domestic residents buy foreign currency in order to buy foreign bonds)
   If the currency does depreciate from 50 to 43, the trade balance will improve to
\( NX = 4500 - 100 \, (43) = 200 \)
and we would have \( Y = C + I + NX = 0.75 \, (4800) + 6000 / 6 + 200 = 3600 + 1000 + 200 = 4800 \).

With fixed exchange rates, the money supply would contract as the Central Bank bought and held domestic
currency on the foreign exchange market; the final result will be \( Ms = 1000 \) as in part (b).

For each of the above, you should draw the shift of the IS or LM curve on the standard \( r - Y \) axes, then
indicate the induced shift of the IS or LM curve under fixed and floating rates.

Problem 12.2. Small open economy in a recession with floating rates and balanced trade.
   Expansion while keeping trade balanced is possible by coordinating monetary and fiscal policy:
   Increase the money supply (the effective force in expanding income under floating rates), but don't wait for the
depreciation to drive the trade balance into surplus – an increase in government spending (or a tax cut) will shift
the IS curve out, and not require a change in the exchange rate or trade balance.

Problem 12.3 Increase in world interest rates.
   a. Increase in government spending and/or tax cuts in large economies will increase the world interest
rate. Draw a standard IS-LM graph on \( r - Y \) axes; the initial equilibrium will no longer hold.
   If you wish, set \( r = 8 \). We will now have, as our IS prediction for income
\( Y = 0.75 \, Y + 6000 / 8 + 5000 - 100 \, (50) \) or \( Y = 3000 \)
and the LM curve will indicate: \( 2000 = 3 \, Y / 8 \) or \( Y = 5333.33 \)
   b. Under floating rates, the exchange rate will depreciate, and the trade balance move into surplus.
   [To be precise, \( NX = 583.33 \) will be required to get to \( Y = 5333.33 \); \( e = 44.167 \) will do this]
   c. Under fixed rates, the money supply will contract to 1125, and \( Y = 3000 \).