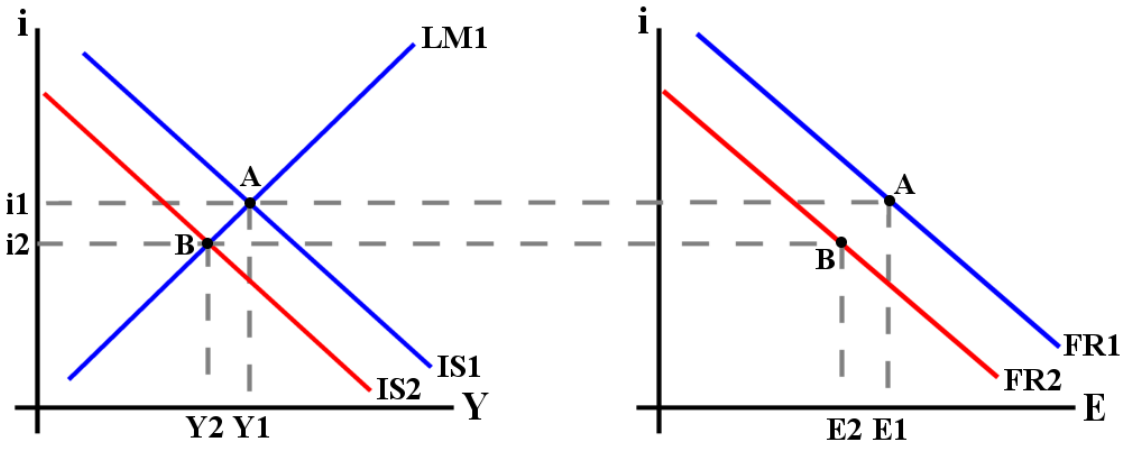
Problem 1

Using the IS-LM-FX model, illustrate what happens when the foreign country increases the money supply. Compare outcomes when home has a floating exchange rate versus a fixed exchange rate.

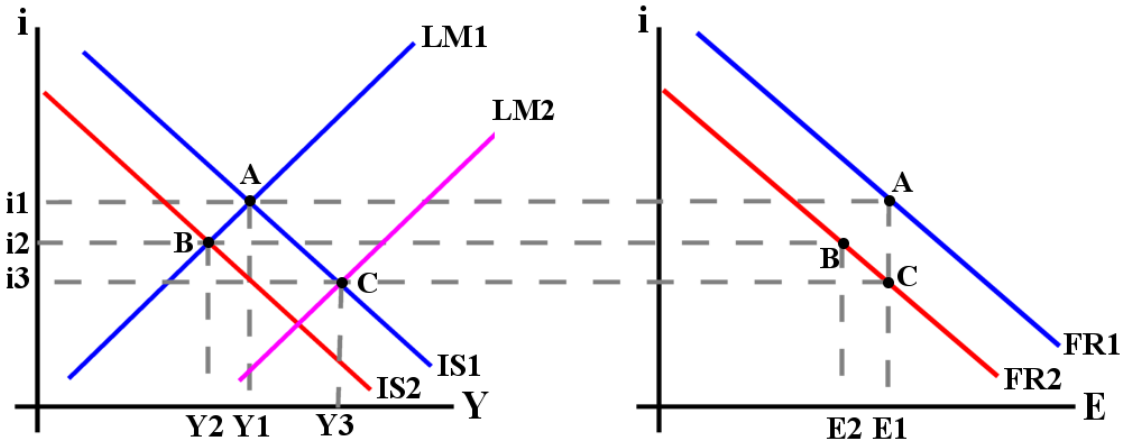
Solution 1

Floating Exchange Regime. When the foreign country increases their money supply, the foreign interest rate i^* will fall. This means the FR curve falls. Accordingly, the exchange rate falls. Since home currency has appreciated, home goods and services are now more expensive, so EX falls and IM increases, and therefore CA falls. So **the IS curve shifts to the left**. If floating, this is the end of the story: we will have lower Y, lower i, and lower E, or a movement from point A to point B in the picture I drew using MS Paint below.

One way of thinking about this is in terms of the foreign country "stealing" demand away from the home country by making foreign goods cheaper. Sometimes this is called *beggar thy neighbor* policy, which sometimes leads to *currency wars* in which countries all try to devalue against each other — this was seen most vividly during the Great Depression after countries abandoned their gold standards.



Fixed Exchange Regime. If the exchange rate is in a fixed regime, however, the central bank will respond to the decrease in the exchange rate by increasing the money supply, which decreases the interest rate. So **the LM curve shifts to the right** just enough so that E goes back to its original rate. Note that the shift of the IS curve reduced the interest rate; and shifting LM to the right will reduce the interest rate further; so we can unambiguously say that i is lower. Therefore we can say that investment is higher than its original level and, because E is at its original level, there is no change to the CA compared to its original level. It follows that Y must have increased above its original level. This is only possible if **the shift in IS is relatively small**. We will have higher Y, lower i, and fixed E, or a movement from point A to point C in the picture I drew using MS Paint below.



Problem 2

Home's currency is the peso and trades at 1 peso per dollar. Home has external assets of $320 billion, all of which are denominated in dollars. It has external liabilities of $800 billion, 90% of which are denominated in dollars.

(a) What is home's external wealth? Is home a net creditor or a net debtor?

(b) If the peso depreciates 1.2 pesos per dollar, what is the change in Home's external wealth in pesos?

Solution 2

Part A. Let d denote dollar units and p denote peso units. Initially home's assets in terms of pesos are worth

$$320\ d\left(\frac{1\ p}{1\ d}\right) = 320\ p.$$

Note that because all external assets are denominated in dollars, all of its value in terms of pesos depends on the exchange rate. Hence we can be a little more detailed and write

$$A_d E_{p/d} = 320\ d\left(\frac{1\ p}{1\ d}\right) = 320\ p,$$

where A_d stands for the value of dollar-denominated assets. Here then you can see that as the exchange rate changes, the value of dollar-denominated assets in terms of pesos changes.

Likewise, 800 billion dollars of assets translates into 800 billion pesos of assets. Of that, 720 is denominated in dollars, and the remaining 80 is denominated in pesos. Using the same idea as before, we can write liabilities as

$$L_p + L_d E_{p/d} = 80\ p + 720\ d\left(\frac{1\ p}{1\ d}\right) = 800\ p.$$

Here you can see that the peso-denominated liabilities do not depend on the exchange rate because, well, they're already quoted in terms of pesos. But you can see that the as the exchange rate changes, the value of the dollar-denominated liabilities in terms of pesos changes. The qualitative observation is that this country's foreign wealth depends a lot on how the exchange rate fluctuates.

We can now conclude that initially home's external wealth in terms of pesos is

$$320\ p - 800\ p = -480\ p.$$

So home country is a net debtor.

Part B. Now the exchange rate changes. The value of external assets becomes

$$A_d E_{p/d} = 320\ d \left(\frac{1.2\ p}{1\ d} \right) = 384\ p,$$

so an increase in the value of their assets. The value of external liabilities becomes

$$L_p + L_d E_{p/d} = 80\ p + 720\ d \left(\frac{1.2\ p}{1\ d} \right) = 944\ p,$$

so an increase in the value of their liabilities as well. We conclude that home's external wealth in terms of pesos is now

$$384\ p - 944\ p = -560\ p,$$

which means they're now in even more debt just because the exchange rate changed. Specifically, the change in home's external wealth is

$$\Delta W = -560\ p - (-480\ p) = -80\ p.$$

Or using the formula, $\Delta W = \Delta E_{p/d} \times (A_d - L_d) = 0.2p/d \times (320\ d - 720\ d) = -80\ p$.

Problem 3

Considering a symmetry-integration diagram, countries that face _____ shocks are more likely to benefit from a fixed exchange rate regime, whereas countries that face _____ shocks are less likely to benefit from fixing their currencies with each other.

(a) symmetric; asymmetric

(b) asymmetric; symmetric

(c) symmetric; symmetric

(d) asymmetric; asymmetric

Solution 3

The correct answer is **choice (a)**. Asymmetric shocks are problematic for fixed exchange rate regimes. We saw from problem 1 that when something changes in the foreign country, the home country has to respond to maintain the fixed exchange rate. So when a shock hits only the foreign country and affects the exchange rate, home country has no choice but to respond to maintain the fixed exchange rate, even though home country was not hit by the shock. That can cause output fluctuations as the LM curve moves around that would not occur under a floating regime. If a shock is symmetric, however, then it affects the foreign country and the home country in the same way, so they'll react in the same way, and the exchange rate will therefore not move much.

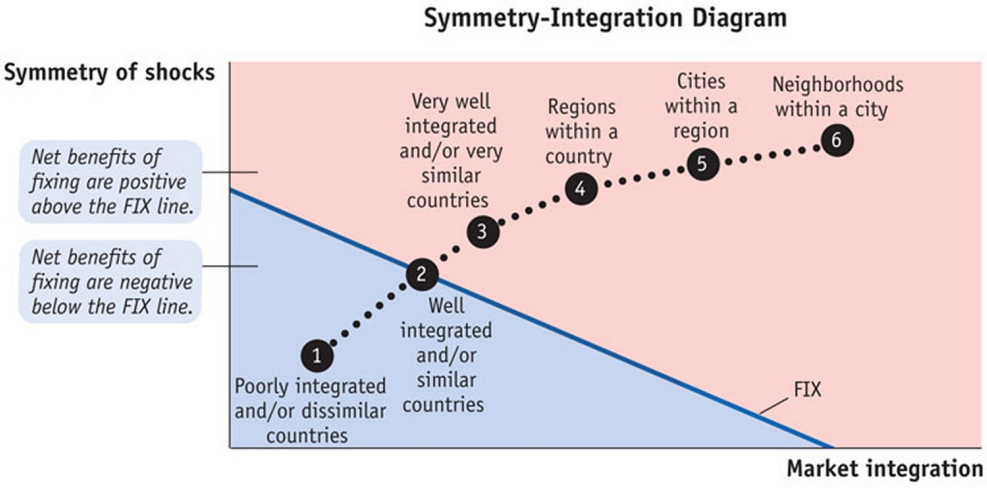
For instance, suppose both home and foreign are hit by a crisis in consumer confidence. This means both home and foreign IS curves will shift to the left as consumption demand falls, which will lower interest rates for both countries. If the domestic return i and the FR curve move down by the same amount, then the exchange rate is unchanged. Both countries can then increase their money supplies, which shifts both countries' LM curves to the right, which increases both countries' interest rates, so domestic i moves up and the FR curve moves up; if they move up by the same amount, then the exchange rate is still unchanged and both have stabilized output.

The level of integration is the other factor that determines whether a fixed exchange rate is a good idea or not. If countries trade a lot, then a fixed exchange rate might facilitate that trade and increase efficiency because all of the calculations become more consistent, and furthermore there is less fear of exchange rate risk.

So, to quote the textbook and summarize:

- As integration rises, the efficiency benefits of a fixed exchange rate increase.
- As symmetric rises, the stability costs of a fixed exchange rate decrease.

In the diagram below, asymmetric and/or low integration fall in the blue (bottom) area, where a floating exchange rate makes more sense. In the red (top) area, symmetry is high and/or integration is high, so a fixed rate makes more sense.



Problem 4

Many countries experiencing high and rising inflation, or even hyperinflation, will adopt a fixed exchange rate regime. The potential costs and benefits of a fixed exchange rate regime in this case include a(n) _____ in fiscal discipline, a _____ of seigniorage, and a _____ of expected future inflation.

(a) increase; gain; decrease

(b) increase; loss; decrease

(c) decrease; gain; decrease

(d) decrease; loss; decrease

Solution 4

The correct answer is **choice (b)**. We know from the policy trilemma that a country loses its monetary autonomy while in a fixed exchange rate regime. Because the government knows it won't be able to simply print money to pay for things (i.e. it can't do seigniorage), it might be more mindful of its budget, an increase in fiscal discipline. And because it can simply print money, it can't create a high-inflation environment, so expected future inflation decreases.

Seigniorage is considered an *inflation tax*, as the following example illustrates. Suppose the money supply is $M_1 = \$100$, held entirely by households, and the price level is currently $P_1 = \$1$. That means the purchasing power of the households' money is $M_1/P_1 = 100$ units of goods. Now suppose the treasury prints \$1 and gives it to the government. The money supply increases by 1% to $M_2 = \$101$ and consequently there is inflation of 1% so that the price level is now $P_2 = 1.01$. This means the purchasing power of the household's money is now only $M_1/P_2 = 99$ units of goods; it is as if the households' original \$100 eroded into \$99. The government, on the other hand, is now \$1 richer, and it can buy $1/1.01 = 0.99$ units of goods that it could not before.

Notice however that every time it prints a new dollar, the price level increases, so the purchasing power of new dollars gets smaller and smaller. In other words, there are diminishing returns to seigniorage. Suppose the treasury prints two dollars instead. Then the price level goes to 1.02 and the government can purchase $2/1.02 = 1.96$ units of goods that it could not before; that's only 0.98 units of goods per dollar. If they print three dollars, it falls to 0.97 units per dollar, and so on and so forth.