

1. Suppose that the current nominal interest rate on one-year U.S. government bonds is 3%, that the current spot exchange rate is 100 yen/\$, and that one can obtain a contract for yen futures for one year from now at 102 yen/\$. What must be the nominal interest rate on one-year Japanese government bonds? How closely must this interest-rate parity relationship hold?

This question can be answered quite easily by noting that the dollar is expected to appreciate vis à vis the yen by 2% in the next year. Thus, for interest-rate parity to hold,

$$i = i^* - \frac{\Delta S}{S}$$

or $3\% = i^* - 2\%$, so $i^* = 5\%$. However, to understand *why* this is the case, think about the transactions involved in an American wealth-holder buying a Japanese or American bond. If she buys \$100 worth of an American bond, she has \$103 at the end of the year. Converting \$100 to yen now yields ¥10,000. Buying a Japanese bond with this gives her ¥10,000 × (1 + i^*) at the end of the year. Converting back to dollars at 102 ¥/\$ yields \$10,000 (1 + i^*)/102, which must equal the \$103 that she gets from the American bond. Thus,

$$103 = \frac{10,000(1 + i^*)}{102},$$
$$1 + i^* = \frac{103 * 102}{10,000} = \frac{10,506}{10,000} = 1.0506,$$
$$i^* = 5.06\%.$$

Note that this equation is precise whereas the rule-of-thumb formula is approximate. The 0.06 comes in through the product of the 3 part and the 2 part. This part is very small when the rate of appreciation and the interest rate are near zero, but it can become important if either the appreciation rate or the interest rate gets much above 10%.

This parity relationship must hold very closely because it is a totally risk-free transaction. The investor has “covered” herself against unforeseen changes in the exchange rate by selling yen forward. Unless i^* was so close to 5.06% that the transaction costs on the currency exchanges exceeded the differential, investors would flock to Japanese or American bonds until the differential closed up.

2. Use the Mundell-Fleming model (of a small economy with perfect capital mobility) to evaluate the following statement: “A recession due to a spending shock will be more severe in a country with fixed exchange rates than if the exchange rate floats.”

The statement is true. Under fixed rates, equilibrium is where the downward-sloping *IS* curve and horizontal *IFM* curves intersect, so a shock to the *IS* curve will have a strong effect, pushing the

equilibrium horizontally in full measure along the *IFM*. Under floating rates, there would be no effect on GDP because equilibrium is determined by the *LM/TR* and *IFM* curves. The *IS* curve's movement would be offset by a change in the exchange rate that causes PCA to change in the opposite direction, returning the *IS* curve and output to the original level.

3. One of the roles of a central bank is to act as a lender of last resort. During the 1990s, Argentina followed an exchange-rate policy called a currency board, in which each Argentine peso was explicitly backed by one dollar of foreign exchange reserves held by the central bank. In the late 1990s, Argentina's banks began to experience liquidity difficulties (and in some cases solvency problems as well). Explain why the currency board arrangement made it impossible for the Argentine central bank to provide lender-of-last-resort services to banks.

To act as a lender of last resort, the central bank must be able to expand the monetary base in order to lend reserves to banks that need them. Under a currency-board arrangement, the Argentine central bank could not expand the monetary base unless it had additional dollars to back up the newly issued reserves. Unless the Federal Reserve would agree to a "currency swap" to give the Argentine central bank additional dollar reserves, it could only expand the base by breaking the currency-board rules, which they eventually did.

4. Suppose that Reedia and Morelandia are both on the gold standard but that there is no international flow of borrowing and lending. Both countries are initially at full employment. Reedia produces veritons, Morelandia produces elmoids, and they trade with one another. A new use is discovered for veritons that increases the demand for them in Morelandia.

a. How will Reedia's primary current account be affected in the short run?

Reedia's PCA will move into surplus as exports increase.

b. Using the *IS/LM* model, show how its short-run macroeconomic equilibrium will be affected by the change in the primary current account.

An increase in the PCA shifts the *IS* curve to the right, increasing output and interest rates.

c. Suppose that, according to the rules of the traditional gold standard, any imbalance of trade is settled by one country's central bank sending gold to the other in exchange for accumulated balances of its currency. Which way will gold flow? How will this affect Reedia's money supply, assuming that its currency is fully backed by gold?

Reedia will accumulate currency in exchange for its increased exports. It will redeem this currency for gold, which will then flow from Morelandia to Reedia. This will expand the Reedian money supply (assuming that the central bank does not "sterilize" the gold inflow).

- d. How will this change in the money supply affect short-run macroeconomic (*IS/LM*) equilibrium in Reedia?

This will shift the Reedian *LM* curve to the right, further stimulating Reedian output.

- e. In the long run, how will Reedia's output, prices, and current-account balance compare to the initial values? Why?

Eventually, Reedian prices should increase which will make Reedian goods more expensive and eliminate the trade imbalance and restore *M/P* and the *LM* curve to their original positions.

5. Following World War I, both France and England had insufficient gold reserves to back the outstanding amounts of their currencies. France chose to devalue the franc relative to gold; England chose to restore the pre-war parity between the pound and gold by contracting its money supply. In the 1920s, England suffered a great depression before the Great Depression, while France was relatively prosperous. How did their foreign-exchange policies contribute to this difference in outcomes?

In both countries, the currency was overvalued, meaning that σ , the real exchange rate, was too high. Since $\sigma = SP/P^*$, the two options available for restoring σ to its equilibrium level are to reduce *S* (devaluation) or to reduce *P* (deflation). The former tends to stimulate the economy by immediately making its goods more competitive on world markets. The latter is effected by decreasing the money supply, which exerts immediate contractionary pressure on the economy and restores competitiveness only slowly as price eventually fall. France prospered while England suffered.

6. Section 11.4.5 suggests that devaluation can stimulate the domestic economy. Can all countries in a fixed exchange rate system use it at the same time? What happens in a world-wide recession if some countries choose to devalue and others don't?

Consider a world with two countries. There is only one exchange rate in such a world, say, £/\$. If the U.S. devalues, decreasing the number of £/\$, then number of \$/£ must increase. One country's devaluation is the rest of the world's currency appreciation (or "revaluation"). The world as a whole cannot devalue—it is a zero-sum game. If some countries devalue in a recession, then they exert stimulative pressure on their own economies but contractionary pressure on those of their trading partners. Competitive devaluations are highly undesirable, but possible in such a situation.