

PROBLEM SET 1 - Solutions

Questions 1-3. Answer True, False, or Uncertain. Briefly explain your answer. No credit without explanation (5 points each).

1. UNCERTAIN. It depends on whether private sector saving offsets public saving (i.e., ‘Ricardian Equivalence’). From the National Income Accounting Identity we have

$$S_p - I \equiv G - T + CA$$

That is, an excess of private sector saving over investment must go into either financing a government deficit or lending abroad (current account surplus). Alternatively, if neither S_p nor I responds to changes in the government deficit, then any increases or decreases in the budget deficit get reflected one-for-one in changes in the current account deficit, i.e., they are “twins”.

2. FALSE. Overshooting occurs because the asset market is always in equilibrium (i.e., Uncovered Interest Parity holds). For example, suppose the money supply falls (permanently). Because prices are temporarily sticky, the real money supply also falls, and this forces up the interest rate (output is assumed constant). At the same time, the lower money supply leads to an expected future appreciation, since people expect the price level to eventually be lower. Now, if the asset markets are in equilibrium, the higher domestic interest rate must be associated with an expected depreciation of the currency (i.e., an expected capital loss matches the higher interest rate, keeping the return on domestic investment the same as on foreign investments). The only way for the currency to appreciate in the long run and depreciate in the short-run is if it initially ‘overshoots’, i.e., appreciates by more than its long-run amount. This overshooting logic would not apply if the asset markets weren’t always in equilibrium.
3. TRUE. According to PPP, $E = P/P^*$. Taking percentage changes of both sides gives us,

$$\begin{aligned} \frac{dE}{E} &= \frac{dP}{P} - \frac{dP^*}{P^*} \\ &= \pi - \pi^* \end{aligned}$$

In other words, the rate of domestic currency depreciation equals the domestic rate of inflation minus the foreign rate of inflation.

The following questions are short answer. 15 points each.

4. Note that even though the interest rate on dollar investments is substantially higher (i.e., 12% vs 4%), the covered return on yen investment is actually higher, because the dollar is selling at a substantial discount in the forward market, i.e., $(144 - 160)/160 = 10\%$. Thus,

the covered yen return is 2% higher. To make arbitrage profits you should borrow low and lend high. For example, borrow \$1. Convert the dollar to yen in the spot market and get 160 yen. Invest the yen at 4% and sell the proceeds forward in the forward market. You will receive $160(1.04)/144 = 1.155$ dollars. Notice that this is more than the 1.12 dollars you will need to pay back your original dollar loan. The difference is pure arbitrage profit, since no risk at all is involved (i.e., everything is locked in today).

5. From the rules of double-entry book-keeping, we know

$$\text{Current Account Surplus} + \text{Financial Account Surplus} \equiv 0$$

(Ignoring, for simplicity, the capital account, which mainly summarizes non-market asset transactions). Thus, in aggregate, if a country has a current account surplus, it must have a Financial Account deficit. That is, it must be experiencing a capital outflow. If the U.S. and Mexico are the only two countries in the world, then obviously Mexico can't have both a current account surplus and a capital inflow from the U.S.

6. The Balassa-Samuelson theory views each country's output as consisting of a mixture of traded and non-traded goods. By assumption, the prices of traded goods are identical in all countries, and determined by world market conditions. If a country experiences relatively rapid productivity growth in its tradeable goods industries, then wages in that country will be bid up, since output prices are given and the return on capital is also fixed by world market conditions if capital is mobile internationally. Now, the increase in wages in the tradeable goods industries forces up wages and prices in the nontradeable goods industries, since they must compete for the same pool of labor. Finally, higher prices of nontradeable goods leads to an overall increase in the price level relative to its PPP value, i.e., countries with high productivity in tradeable goods (roughly speaking, 'rich' countries) have apparently 'overvalued' exchange rates, i.e., their currencies have strong purchasing power when spent in poorer countries.
7. With the money supply constant, and prices (temporarily) sticky, the reduction in money demand produces an equilibrating fall in the interest rate. Lower domestic interest rates then cause the domestic currency to depreciate in the fx market. (This depreciation is actually greater when the money demand decrease is permanent, since the price level will eventually rise in order to reduce the real money supply, and then, from PPP, this will cause a long-run currency depreciation, which then cause E^e to rise). As prices gradually rise, the interest rate rises back to its original level, and the exchange rate appreciates down to its new (higher) long-run level. Overall, the adjustment path is identical to that caused by a permanent increase in the money supply!
8. If the domestic currency is appreciating at the same time domestic interest rates are rising, this suggests a real interest rate increase, perhaps due to an increase in money demand. The Fed should respond by increasing money supply. On the other hand, if the domestic currency is depreciating when nominal rates are rising, this suggests that they are rising due to expected inflation, and therefore, the Fed should not increase the money supply. If anything, they should cut back on the money supply in order to bring down inflation.