Chapter 3
Foreign Exchange Determination and Forecasting

1. Applying expansionary macroeconomic policy, which results in higher goods prices and lower real interest rates, will not reduce the balance of payments deficit. Higher prices will make the country’s goods less competitive internationally, and lower interest rates will discourage foreign capital. Thus, the balance of payments deficit will worsen instead of improve. On the other hand, (a), (b), and (d) will help in remedying the balance of payments deficit. Accordingly, the answer is (c).

2. a. One advantage of a wider band is “emotional.” France could claim that it did not devalue its currency. Another advantage is flexibility. If there were no long-term fundamental reasons (inflation, balance of payments deficit, etc.) for a devaluation, the temporary pressure on the franc could ease and the franc could later revert to its previous level. The disadvantage of a wider band is exchange rate uncertainty for all firms. A “credible” small band is preferable for firms conducting international trade,

b. A wider band makes speculation less attractive, because there is no guarantee that a central bank will defend its currency until the wide fluctuation margin is reached.

3. a. The American investor has paid a 25 percent premium over the price paid by a domestic investor. Yet, he receives the same dividends as the domestic investor. Therefore, his investment bears a smaller yield than it would for a domestic investor.

b. Lifting of the exchange controls would be bad news to an existing foreign investor in Paf, since her asset could only be repatriated at the normal pif rate (1.00), while she had bought it at the financial rate (1.25).

c. Lifting of the exchange controls would be good news to foreign investors planning to invest in Paf in the future, because they would no longer have to pay the 25 percent premium when buying assets in Paf.

4. Remember that the Eurozone is made up of those countries in the EU that have adopted the euro as common currency. Statements I and III are clearly correct. Statement II is clearly not correct, because there is a possibility that more countries may join the Eurozone in future. For example, the British are debating whether to join the Eurozone.

5. The statement is true. Because of riskless arbitrage, interest rate parity between two currencies would hold if the markets for both are free and deregulated. Developed financial markets tend to be more free and deregulated. A developing country is more likely to impose various forms of capital controls and taxes that impede arbitrage. A developing country is economically not as well integrated with the world financial markets as the developed markets are. Also, some smaller currencies can only be borrowed and lent domestically, and the domestic money markets of developing countries are more likely to be subjected to political risk.
6. a. Using the first-order approximation of PPP relationship, the variation in rupee to dollar exchange rate should equal the inflation differential between rupee and dollar. So, the rupee to dollar exchange rate should increase by $6 - 2.5 = 3.5\%$. That is, the rupee should depreciate by $3.5\%$ relative to the dollar.

b. The nominal dollar return for the U.S. institutional investor is approximately $12 - 5 = 7\%$. The real return for the U.S. investor is approximately $7 - 2.5 = 4.5\%$. The real return for the Indian investor is approximately $12 - 6 = 6\%$. Thus, the U.S. investor has a lower real return than the Indian investor. This is so because the rupee depreciated with respect to the dollar by more than what the PPP relationship would indicate. Indeed, the difference between the real returns is $6 - 4.5 = 1.5\%$, which is the same as the difference between the actual depreciation of the rupee and the depreciation that should have occurred as per PPP ($5 - 3.5 = 1.5\%$).

7. If a country’s currency is undervalued, it means that the real prices of assets in this country are low compared with other countries. Also, the wages are lower in real terms than in other countries. Thus, investors from other countries would invest in this country to take advantage of low prices and wages. This action would help in the appreciation of the undervalued currency and restoration of the PPP in the long run. In terms of foreign trade, an undervalued currency implies that exports from this country would get a boost while imports would become less attractive. This would also help in the appreciation of the undervalued currency and restoration of the PPP in the long run.

8. In risk-neutral efficient foreign exchange markets, the forward rate is the expected value of the future spot rate. The forward rate can be computed using the interest rate parity relation. Because the exchange rate is given in $:\text{SFr}$ terms, the appropriate expression for the interest rate parity relation is

\[
\frac{F}{S} = \frac{1 + r_{\text{SFr.}}}{1 + r_{\text{d}}} 
\]

(that is, \(r_{\text{SFr.}}\) is a part of the numerator and \(r_{\text{d}}\) is a part of the denominator). Accordingly, the three-month forward rate is

\[
F = 1.4723 \cdot \frac{1 + 0.0095}{1 + 0.0180} = 1.4600
\]

thus, the implied market prediction for the three-month ahead exchange rate is SFr1.4600 per $.

9. As per the model, one € would be worth $0.9781 six months later. Based on the forward rate, one € would be worth $0.9976 six months later. Therefore, the market participants, who believe that the model is quite good, would buy the dollar in the forward market (sell euros). Consequently, the price of the euro forward would decrease (the dollar forward would increase) and the forward rate would become equal to $0.9781 per €. The spot exchange rate and the dollar and euro interest rates would change so as to be consistent with this forward rate. A look at the interest rate parity relationship—written in the form

\[
\frac{F}{S} = \frac{1 + r_{\text{d}}}{1 + r_{\text{e}}} \text{€}
\]

as \(F\) and \(S\) are in €:$ terms—suggests that with the decrease in forward rate from $0.9976 per € to $0.9781 per €, the spot rate and interest rate in dollars are likely to go down and interest rate in euros is likely to go up.
10. a. The forward rate can be computed using the interest rate parity relation. Because the exchange rate is given in £:$ terms, the appropriate expression for the interest rate parity relation is

\[ \frac{F}{S} = 1 + \frac{r_d}{1 + r_f} \]

(that is, $r_d$ is a part of the numerator, and $r_f$ is a part of the denominator). Accordingly, the one-year forward rate is

\[ F = \frac{1.0200}{1.0425} = \frac{1.5620}{1.5315} = 1.5283 \text{ per £.} \]

b. Based on the forward rate, one pound would be worth $1.5283 one year later. The model predicts that one pound would be worth $1.5315 one year later. Thus, as per the model, the pound is underpriced in the forward market. Accordingly, Dustin Green would buy pounds forward at $1.5283/£.

c. If everyone were to buy pounds forward, the price of pounds forward would increase and become equal to $1.5315 per £. The spot exchange rate and the dollar and pound interest rates would change so as to be consistent with this forward rate. A look at the interest rate parity relationship suggests that the spot rate and the interest rate in dollars are likely to go up and the interest rate in pounds is likely to go down, to be consistent with the increase in the forward rate.

11. a. If the market participants are risk-neutral, the expected future spot exchange rate would be the same as the current forward rate. The forward rate is determined based on the current spot exchange rate and the interest rate differential between the two currencies. Thus, the expected future spot exchange rate would depend on the current spot exchange rate and the interest rate differential.

b. If the market participants are risk-averse, the forward rate would differ from the expected future spot exchange rate by the risk premium. The risk premium, based on the extent of risk aversion of the market participants, could be positive or negative. So, the expected future spot exchange rate is the forward rate less the risk premium. Since the forward rate is based on the current spot exchange rate and the interest rate differential between the two currencies, the expected future spot exchange rate would depend on the current spot exchange rate, the interest rate differential, and the risk premium.

12. There is some evidence of positive serial correlation in exchange rate movements (real and nominal). Hence, when a currency is going up, a reasonable forecast is that it will continue going up. Similarly, when a currency is going down, a reasonable forecast is that it will continue going down. However, at some point in time, the trend would reverse, and the problem is that a trend-based forecasting model cannot forecast when this turning point would occur. Although these turning points may be infrequent, they can be the occasion of a huge swing. The Mexican peso is a good example. For a few years until the end of 1994, the real value of the peso appreciated steadily. So, forecasters using trend models for the real exchange rates were quite successful for many months. However, in December 1994, the peso suddenly crashed and lost around half of its value.

13. Statements (a), (c), and (d) are true. Statement (b) is not true, because the objective of central bank activity in the foreign exchange market is not to profit from trading activities, but to implement monetary policy and exchange rate targets.
14. A mean-reverting time series is one that may diverge from its fundamental value in the short run but reverts to its fundamental value in the long run. Empirical evidence suggests that exchange rates are mean reverting. The real exchange rates (observed exchange rate minus inflation) do deviate from the fundamental value implied by PPP in the short run, but tend to revert to the fundamental value in the long run.

15. Most econometric models are unsuitable for short-term exchange rate forecasts, as they model long-term structural economic relationships. For long-term exchange rate forecasts, the use of econometric models has some problems. First, most of them rely on predictions for certain key variables, such as money supply and interest rates. It is not easy to forecast these variables. Second, the structural correlation estimated by the parameters of the equation can change over time, so that even if all causative variables are correctly forecasted, the model can still yield poor exchange rate predictions. In periods when structural changes are rapid compared with the amount of time-series data required to estimate parameters, econometric models are of little help.

16. Technical analysis is more likely to be used for short-term exchange rate movements, while the econometric approach is more likely to be used for long-term exchange rate movements. The manager of a currency hedge fund and currency traders change their foreign exchange positions quite quickly, and are interested in short-term changes in exchange rates. On the other hand, the manager of an international stock portfolio is unlikely to change his foreign exchange positions quickly, because the transaction costs of buying and selling stocks are quite high. Therefore, the manager of an international stock portfolio is more interested in the long-term movements in exchange rates. Similarly, the long-term strategic planner of a corporation is interested in the long-term movements. Accordingly, the answers are:
   a. Technical analysis
   b. Econometric approach
   c. Technical analysis
   d. Econometric approach

17. a. The absolute values of prediction errors are as follows: Forward rate: \(1.440 - 1.308 = 0.132\); Analyst A: \(1.410 - 1.308 = 0.102\); and Analyst B: \(1.580 - 1.308 = 0.272\). Thus, the forecast by Analyst A was the most accurate.
   b. The forward rate and Analyst B erroneously predicted that the SFr to \$ exchange rate would go up from the then-spot rate of SFr 1.420 per \$; that is, the SFr would depreciate. Only Analyst A correctly predicted that the Swiss franc would appreciate.

18. a. The absolute values of forecast errors are as follows: Forward rate: \(148.148 - 144.697 = 3.451\); Commerzbank: \(148.148 - 142 = 6.148\); and Harris Bank: \(156 - 148.148 = 7.852\). Thus, the forecast as per the forward rate was the most accurate, followed by Commerzbank, and then by Harris Bank.
   b. Although the forward rate and Commerzbank were more accurate than Harris Bank, both of them erroneously predicted that the yen would appreciate relative to the dollar. Only Harris Bank correctly predicted that the yen would depreciate.
c. Commerzbank’s forecast was ¥142 per $, which was less than the forward rate. Therefore, David Brock bought yen forward (sold dollars) at the rate of ¥144.697 per $. Because the actual rate turned out to be ¥148.148 per $, buying yen forward did not turn out to be the right strategy. On the other hand, Harris Bank’s forecast was ¥156 per $, which was more than the forward rate. Therefore, Brian Lee sold yen forward (bought dollars) at the rate of ¥144.697 per $. Because the actual rate turned out to be ¥148.148 per $, selling yen forward turned out to be the right strategy.

d. Commerzbank’s forecast had a lower forecast error than Harris Bank’s in Part (a). However, in Part (c), it was right to buy and sell based on Harris Bank’s forecast and not Commerzbank’s. The reason is that Harris Bank’s forecast turned out to be on the right side of the forward rate, while Commerzbank’s did not.

19. Let the forecasts made by the Industrial Bank of Japan at the beginning of period $t$ for the beginning of period $t+1$ be $E(S_{t+1}|\phi_t)$. Let the forward rates quoted at the beginning of period $t$ for the beginning of period $t+1$ be $F_t$, and the actual spot rates at the beginning of periods $t$ and $t+1$ be $S_t$ and $S_{t+1}$, respectively. The percentage forecast errors ($e$ and $e_t$) for each forecast made by the Industrial Bank of Japan and the forward rate are computed as $e_{t+1} = (S_{t+1} - E(S_{t+1}|\phi_t))/S_t$ and $e_{t+1} = (S_{t+1} - F_t)/S_t$, respectively. The following table details the computations.

| Pd. | $S_t$   | $F_t$   | $E(S_{t+1}|\phi_t)$ | $S_{t+1}$ | $e_{t+1}$ | $e_t$ | $e_{t+1}^2$ | $e_t^2$ |
|-----|---------|---------|----------------------|-----------|-----------|------|------------|--------|
| 1   | 143.164 | 142.511 | 140                  | 144.300   | 0.0300    | 0.0125 | 0.0009     | 0.0002 |
| 2   | 144.300 | 143.968 | 141                  | 152.750   | 0.0814    | 0.0609 | 0.0066     | 0.0037 |
| 3   | 152.750 | 153.600 | 151                  | 149.400   | -0.0105   | -0.0275| 0.0001     | 0.0008 |
| 4   | 149.400 | 149.400 | 143                  | 129.600   | -0.0897   | -0.1325| 0.0080     | 0.0176 |
| 5   | 129.600 | 129.700 | 130                  | 129.500   | -0.0039   | -0.0015| 0.0000     | 0.0000 |
| 6   | 129.500 | 129.800 | 131                  | 139.250   | 0.0637    | 0.0730 | 0.0041     | 0.0053 |

MSE  0.0033 0.0046  
RMSE 0.0573 0.0678

The RMSE for the Industrial Bank of Japan is lower than that for the forward rate. Thus, as per the limited data set in this problem, the Industrial Bank outperformed the forward rate in terms of accuracy of the forecasts, as measured by the RMSE. We have not tested whether the difference in forecast performances is statistically significant.