

### EXAMPLE 3

#### Forward Rates and the Mark-to-Market Value of Forward Positions

A dealer is contemplating trade opportunities in the CHF/GBP currency pair. The following are the current spot rates and forward points being quoted for the CHF/GBP currency pair:

Spot rate (CHF/GBP)	1.4939/1.4941
One month	−8.3/−7.9
Two months	−17.4/−16.8
Three months	−25.4/−24.6
Four months	−35.4/−34.2
Five months	−45.9/−44.1
Six months	−56.5/−54.0

1. The current all-in bid rate for delivery of GBP against the CHF in three months is *closest* to:
  - A. 1.49136.
  - B. 1.49150.
  - C. 1.49164.
2. The all-in rate that the dealer will be quoted today by another dealer to sell the CHF six months forward against the GBP is *closest* to:
  - A. 1.48825.
  - B. 1.48835.
  - C. 1.48870.

Some time ago, Laurier Bay Capital, an investment fund based in Los Angeles, hedged a long exposure to the New Zealand dollar by selling NZD 10 million forward against the USD; the all-in forward price was 0.7900 (USD/NZD). Three months prior to the settlement date, Laurier Bay wants to mark this forward position to market. The bid–offer for the USD/NZD spot rate, the three-month forward points, and the three-month Libors (annualized) are as follows:

Spot rate (USD/NZD)	0.7825/0.7830
Three-month points	–12.1/–10.0
Three-month Libor (NZD)	3.31%
Three-month Libor (USD)	0.31%

3. The mark-to-market value for Laurier Bay’s forward position is *closest* to:
  - A. –USD 87,100.
  - B. +USD 77,437.
  - C. +USD 79,938.

Now, suppose that instead of having a long exposure to the NZD, Laurier Bay Capital had a long forward exposure to the USD, which it hedged by selling USD 10 million forward against the NZD at an all-in forward rate of 0.7900 (USD/NZD). Three months prior to settlement date, it wants to close out this short USD forward position.

4. Using the above table, the mark-to-market value for Laurier Bay’s short USD forward position is *closest* to:
  - A. –NZD 141,117.
  - B. –NZD 139,959.
  - C. –NZD 87,100.

**Solution to 1:**

A is correct. The current all-in three-month bid rate for GBP (the base currency) is equal to  $1.4939 + (-25.4/10,000) = 1.49136$ .

**Solution to 2:**

C is correct. The dealer will sell CHF against the GBP, which is equivalent to buying GBP (the base currency) against the CHF. Hence, the *offer* side of the market will be used for forward points. The all-in forward price will be  $1.4941 + (-54.0/10,000) = 1.48870$ .

**Solution to 3:**

C is correct. Laurier Bay sold NZD 10 million forward to the settlement date at an all-in forward rate of 0.7900 (USD/NZD). To mark this position to market, the fund would need an offsetting forward transaction involving buying NZD 10 million three months forward to the settlement date. The NZD amounts on the settlement date net to zero. For the offsetting forward contract, because the NZD is the base currency in the USD/NZD quote, buying NZD forward means paying the offer for both the spot rate and the forward points. This scenario leads to an all-in three-month forward rate of  $0.7830 - 0.0010 = 0.7820$ . On the settlement day, Laurier Bay will receive USD 7,900,000 ( $\text{NZD } 10,000,000 \times 0.7900 \text{ USD/NZD}$ ) from the original forward contract and pay out USD 7,820,000 ( $\text{NZD } 10,000,000 \times 0.7820 \text{ USD/NZD}$ ) based on the offsetting forward contract. The result is a net cash flow on the settlement day of  $10,000,000 \times (0.7900 - 0.7820) = +\text{USD } 80,000$ .

This is a cash inflow because Laurier Bay sold the NZD forward and the NZD depreciated against the USD. This USD cash inflow will occur in three months. To calculate the mark-to-market value of the original forward position, we need to calculate the present value of this USD cash inflow using the three-month USD discount rate (we use USD Libor for this purpose):

$$\frac{\text{USD } 80,000}{1 + 0.0031 \left[ \frac{90}{360} \right]} = +\text{USD } 79,938$$

#### Solution to 4:

B is correct. Laurier Bay initially sold USD 10 million forward, and it will have to buy USD 10 million forward to the same settlement date (i.e., in three months' time) in order to close out the initial position. Buying USD using the USD/NZD currency pair is the same as selling the NZD. Because the NZD is the base currency in the USD/NZD quote, selling the NZD means calculating the *bid* rate:

$$0.7825 + (-12.1/10,000) = 0.78129$$

At settlement, the USD amounts will net to zero (USD 10 million both bought and sold). The NZD amounts will not net to zero, however, because the all-in forward rate changed between the time Laurier Bay initiated the original position and the time it closed out this position. At initiation, Laurier Bay contracted to sell USD 10 million and receive NZD 12,658,228 (i.e.,  $10,000,000/0.7900$ ) on the settlement date. To close out the original forward contract, Laurier Bay entered into an offsetting forward contract to receive USD 10 million and pay out NZD 12,799,345 (i.e.,  $10,000,000/0.78129$ ) at settlement. The difference between the NZD amounts that Laurier Bay will receive and pay out on the settlement date equals

$$\text{NZD } 12,658,228 - \text{NZD } 12,799,345 = -\text{NZD } 141,117.$$

This is a cash *outflow* for Laurier Bay because the fund was *short* the USD in the original forward position and the USD subsequently *appreciated* (i.e., the NZD subsequently depreciated, because the all-in forward rate in USD/NZD dropped from 0.7900 to 0.78129). This NZD cash outflow occurs in three months' time, and we must calculate its present value using the three-month NZD Libor:

$$\frac{-\text{NZD } 141,117}{1 + 0.0331 \left( \frac{90}{360} \right)} = -\text{NZD } 139,959$$