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Hedging Cash Flow With Currency Options



Who Hedges U.S. Dollar Cash Flow



- A Canadian exporter is at risk if the USD/CAD exchange rate decreases.
- A Canadian importer is at risk if the USD/CAD exchange rate increases.

Canadian Exporter



- A Canadian exporter is selling goods to a U.S. distributor.
- Payment is to be received at a later date.
- Risk of a declining U.S. dollar during the period.

Hedging the Exchange Rate



- U.S. dollar is trading at C\$1.0650.
- The USX would reflect a value of 106.50.
- The Canadian exporter expects to receive payment of US\$1,000,000.00 in 3 months.
- Payment corresponds to C\$1,065,000.00.

How Many USX Options To Buy?



- Formula

Number of put contracts = $\frac{\text{U.S. dollar amount to hedge}}{\text{Contract size of the option}}$

$$= \frac{\$1,000,000.00 \text{ USD}}{\$10,000.00}$$

$$= 100 \text{ contracts}$$

Cost of the USX Put Hedge



- Exporter may purchase 100 3-month 106.50-strike put.
- 3-month 106.50-strike put is trading at \$3.10 per contract.
- Cost of one contract is $\$3.10 \times 100 = \310.00
- Exporter pays $\$310.00 \times 100 = \$31,000.00$.

Consider a U.S. Dollar drop



- The exporter expects to receive US\$1,000,000.00, which corresponds to C\$1,065,000.00.
 - $\text{US\$1,000,000.00} \times 1.0650$
- If the exchange rate drops to 1.01 by the payment date, the exporter would receive C\$1,010,000.00.
 - $\text{US\$1,000,000.00} \times 1.01$
- The loss is C\$55,000.00.

USX Put Option Settlement Value



- Difference between the strike price and the BoC noon rate at expiration, multiplied by the trading unit of the contract.

Settlement Value

$$= \frac{(\text{Strike price} - \text{BoC noon rate})}{1 \text{ USD}} \times 10,000 \text{ USD} \times \frac{1 \text{ CAD}}{100 \text{ cents CAN}}$$

$$= (\text{Strike price} - \text{BoC noon rate}) \times 100$$

USX Put Options Settlement Value



Settlement Value

$$= (\text{Strike price} - \text{BoC noon rate}) \times 100$$

$$= (106.5 - 101) \times 100$$

$$= \$550.00$$

- $\$550.00 \times 100 \text{ contracts} = \$55,000.00$
- $\$55,000.00 - \$31,000.00 = \$24,000.00$
- The position is cash settled in Canadian dollars.

Result of the Hedge



- Payment received is C\$1,010,000.00.
 - $\$1,000,000.00 \times 1.01$
- Loss on payment is C\$55,000.00.
 - $\$1,065,000.00 - \$1,010,000.00$
- Net profit on USX put options is C\$24,000.00.
 - $\$55,000.00 - \$31,000.00$
- Net payment received is C\$1,034,000.00.
 - $\$1,010,000.00 - \$24,000.00$

Consider a U.S. Dollar Increase



- Exporter expects US\$1,000,000.00, which corresponds to C\$1,065,000.00.
 - $\text{US\$1,000,000.00} \times 1.0650$
- If the exchange rate increases to 1.12, the exporter would receive C\$1,120,000.00.
 - $\text{US\$1,000,000.00} \times 1.12$
- The profit is C\$55,000.00.

Result of the Hedge



- Payment received is C\$1,120,000.00.
 - $\$1,000,000.00 \times 1.12$
- Profit on payment is C\$55,000.
 - $\$1,120,000.00 - \$1,065,000.00$
- Loss on USX put options is C\$31,000.00.
 - Premium paid
- Net payment received is C\$1,089,000.00.
 - $\$1,120,000.00 - \$31,000.00$

Canadian Importer



- A Canadian importer is buying goods from a U.S. distributor.
- Payment is to be made at a later date.
- Risk of an increasing U.S. dollar during the period.

Hedging the Exchange Rate



- U.S. dollar is trading at C\$1.0650.
- The USX would reflect a value of 106.50.
- The Canadian importer must pay US\$1,000,000.00 in 3 months.
- Payment corresponds to C\$1,065,000.00.

How Many USX Options To Buy?



- Formula

Number of put contracts = $\frac{\text{U.S. dollar amount to hedge}}{\text{Contract size of the option}}$

$$= \frac{\$1,000,000.00 \text{ USD}}{\$10,000.00}$$

$$= 100 \text{ contracts}$$

Cost of the USX Call Hedge



- Importer purchases 100 3-month 106.50-strike call.
- 3-month 106.50-strike call is trading at \$3.40 per contract.
- Cost of one contract is $\$3.40 \times 100 = \340.00
- Exporter pays $\$340 \times 100 = \text{C}\$34,000.00$

Consider a U.S. Dollar Increase



- The importer expect to pay US\$1,000,000.00 or C\$1,065,00.00.
 - $\text{US\$1,000,000.00} \times 1.0650$
- If the exchange decreases to 1.12 by the payment date, the importer will have to pay C\$1,120,000.00.
 - $\text{US\$1,000,000.00} \times 1.12$
- The loss is C\$55,000.00.

USX Call Option Settlement Value



- Difference between the BoC noon rate at expiration and the strike price, multiplied by the trading unit of the contract.

Settlement Value

$$= \frac{(\text{BoC noon rate} - \text{strike price}) \times 10,000 \text{ USD}}{1 \text{ USD}} \times \frac{1 \text{ CAD}}{100 \text{ cents CAN}}$$

$$= (\text{BoC noon rate} - \text{strike price}) \times 100$$

USX Call Option Settlement Value



Settlement Value

$$= (\text{BoC noon rate} - \text{strike price}) \times 100$$

$$= (112 - 106.5) \times 100$$

$$= \$550.00$$

- $\$550.00 \times 100 \text{ contracts} = \$55,000.00$
- $\$55,000.00 - \$34,000.00 = \$21,000.00$
- The position is cash settled in Canadian dollars.

Result of the Hedge



- Payment to be made is C\$1,120,000.00.
 - $\$1,000,000.00 \times 1.12$
- Loss on payment is C\$55,000.
 - $\$1,120,000.00 - \$1,065,000.00$
- Net profit on USX put options is C\$21,000.00.
 - $\$55,000.00 - \$34,000.00$
- Net payment made is C\$1,099,000.00.
 - $\$1,120,000 - \$21,000.00$

Consider a U.S. Dollar Decrease



- Importer must pay US\$1,000,000.00, which corresponds to C\$1,065,000.00.
 - $\text{US\$1,000,000.00} \times 1.0650$
- If the exchange rate decreases to 1.01, the importer would pay C\$1,010,000.00.
 - $\text{US\$1,000,000.00} \times 1.01$

Result of the Hedge



- Payment made is C\$1,010,000.00.
 - $\$1,000,000.00 \times 1.01$
- Profit on payment is C\$55,000.
 - $\$1,065,000.00 - \$1,010,000.00$
- Loss on USX call options is C\$34,000.00.
 - Premium paid
- Net payment made is C\$1,044,000.00.
 - $\$1,010,000.00 - \$34,000.00$

Important Considerations



- The exporter and importer have only hedged a portion of the currency risk with the 100 contracts.
- A more accurate hedge requires the use of the option's delta.

$$\text{Number of option contracts} = \frac{\text{U.S. dollar amount to hedge}}{\left\{ \frac{\text{Contract size of the option}}{\text{Delta of the option}} \right\}}$$

Offsetting the Cost of the Hedge



- The exporter and importer can use a collar strategy to partially or completely offset the cost of the hedge.
- The exporter could sell call options and use the premium collected to offset the cost of the puts.
- The importer could sell put options and use the premium collected to offset the cost of the calls.

