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Hedging Cash Flow With Currency Options

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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.

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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.

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How Many USX Options To Buy?

- Formula

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

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

$$= 100 \text{ contracts}$$

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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 X 100 = $310.00

- Exporter pays $310.00 X 100 = $31,000.00.

Consider a U.S. Dollar drop

- The exporter expects to receive US$1,000,000.00, which corresponds to C$1,065,00.00.
  - US$1,000,000.00 X 1.0650

- If the exchange rate drops to 1.01 by the payment date, the exporter would receive C$1,010,000.00.
  - US$1,000,000.00 X 1.01

- The loss is C$55,000.00.

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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

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

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

USX Put Options Settlement Value

Settlement Value

= (Strike price - BoC noon rate) X 100
= (106.5 - 101) x 100
= $550.00

- $550.00 X 100 contracts = $55,000.00

- $55,000.00 - $31,000.00 = $24,000.00

- The position is cash settled in Canadian dollars.

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Result of the Hedge

- Payment received is C$1,010,000.00.
  - $1,000,000.00 X 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

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Consider a U.S. Dollar Increase

- Exporter expects US$1,000,000.00, which corresponds to C$1,065,000.00.
  - US$1,000,000.00 X 1.0650

- If the exchange rate increases to 1.12, the exporter would receive C$1,120,000.00.
  - US$1,000,000.00 X 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 X 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

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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.

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How Many USX Options To Buy?

- Formula

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

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

$$= 100 \text{ contracts}$$

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 X 100 = $340.00

- Exporter pays $340 X 100 = C$34,000.00

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Consider a U.S. Dollar Increase

- The importer expect to pay US$1,000,000.00 or C$1,065,00.00.
    - US$1,000,000.00 X 1.0650

- If the exchange decreases to 1.12 by the payment date, the importer will have to pay C$1,120,000.00.
    - US$1,000,000.00 X 1.12

- The loss is C$55,000.00.

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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

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

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

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USX Call Option Settlement Value

Settlement Value

= (BoC noon rate - strike price) X 100
= (112 - 106.5) x 100
= $550.00

- $550.00 X 100 contracts = $55,000.00

- $55,000.00 - $34,000.00 = $21,000.00

- The position is cash settled in Canadian dollars.

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Result of the Hedge

- Payment to be made is C$1,120,000.00.
  - $1,000,000.00 X 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

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Consider a U.S. Dollar Decrease

- Importer must pay US$1000,000.00, which corresponds to C$1,065,000.00.
    - US$1,000,000.00 X 1.0650

- If the exchange rate decreases to 1.01, the importer would pay C$1,010,000.00.
    - US$1,000,000.00 X 1.01

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Result of the Hedge

- Payment made is C$1,010,000.00.
  - $1,000,000.00 X 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

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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.

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

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Offsetting the Cost of the Hedge

- The exporter and importer can use a collar strategy to partially or completely off set the cost of the hedge.

- The exporter could sell call options and use the premium collected to off set the cost of the puts.

- The importer could sell put options and use the premium collected to off set the cost of the calls.

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