Review of Hedging a Payable or a Receivable in a Foreign Currency
I. Idea is to offset a short position with a long position, or, offset a long position with a short position.

Account Payable

![Graph showing profit vs. spot rate with spot rate at 0]

Account Receivable

![Graph showing profit vs. spot rate with spot rate at 0]

A. Hedge with Forward Position

Gain = (S-F) x FX amount

Gain = (F-S) x FX amt.
I. B. Hedge with Money Market (MM) Instrument

1. Buying a MM security is a long position.
2. Borrow at MM rate is a short position.

Account Payable

a) Buy and hold the foreign currency.

b) How much to buy?

c) Borrow cost of FX in U.S. MM.

d) Pay liability with foreign MM instrument.

e) Cost is same as forward hedge if IRP holds.

Account Receivable

a) Borrow in foreign currency.

b) How much to borrow?

c) Invest loan proceeds in U.S. MM instrument.

d) Pay off loan with receivable.

e) Cost is same as forward hedge if IRP holds.
I. C. Hedge with Options

1. Buying a call is a long position.
2. Buying a put is a short position.

<table>
<thead>
<tr>
<th>Account Payable</th>
<th>Account Receivable</th>
</tr>
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<tbody>
<tr>
<td>Buy calls with X=forward rate</td>
<td>Buy puts with X=forward rate</td>
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Profit (at expiration)  

Net position

Forward rate

S($)
I. C. Hedge with Options

3. Buying a call is a long position.
4. Buying a put is a short position.

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![Graph showing profit (at expiration) vs. S($/j) for Account Payable and Account Receivable.](image)

- **Profit (at expiration)**: The profit at expiration for both accounts is zero when the option expires out of the money.
- **Net position**: The net position for both accounts shows the profit at expiration when the option expires in the money. The net position for Account Payable is negative, indicating a loss, and for Account Receivable, it is positive, indicating a gain.
I. D. Hedge with Swaps.

1. This is a sequence of long or short forward positions.

2. Use with a known sequence of future FX payables or future FX receivables.

II. Example:

\[ S(\$/\€) = $1.25/\€ \quad \text{1- year Forward} = $1.23/\€ \]

\[ i_s = 4\% \text{/ year,} \quad i_\€ = 5.7\%/\text{year} \]

\[ C_0 = $0.05/\€ \quad P_0 = $0.08/\€ \]

Position: €1 Million payable due in one year, or €1 Million receivable due in one year.

A. Forward Hedge:

<table>
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<th>Payable</th>
<th>Receivable</th>
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<tr>
<td>Buy €1M at $1.23/€</td>
<td>Sell €1M at $1.23/€</td>
</tr>
<tr>
<td>= $1,230,000</td>
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</tr>
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</table>

Suppose in 1- year \[ S(\$/\€) = $ 1.27/\€ \]

\[ \text{Gain} = (1.27 - 1.23) \times 10^6 \quad \text{Gain} = (1.23 - 1.27) \times 10^6 \]

\[ = $40,000 \quad = -$40,000 \]
II.

B. Money Market (MM) Hedge.

1. Account Payable €1 Million.

\[ PV = \frac{\text{€1 M}}{(1.057)} = \text{€946,100} \]

\[ In \$ = \frac{\$1.25}{\text{€}} \times \text{€946,100} = \$1,182,625 \]

a. Borrow $1,182,625 in U.S. @ 4%.

b. Purchase €946,100 and invest at 5.7%.
   \[ \Rightarrow \text{€1M in one year.} \]

c. In one year pay $1,229,930 in U.S.

II.

2. Account Receivable €1 Million.

a. Borrow €946,100 in euroland.

b. Purchase \( \frac{\text{€946,100} \times \$1.25}{\text{€}} = \$1,182,625 \).

c. Invest $1,182,625 for one year at 4%\( = \$11,229,930 \) in one year.

d. In one year pay loan of €1 M with €1 M receivable.
V.C. Options Hedge.

1. Account payable €1Million due in one year.
   Buy one-year calls on €1M with X= $1.23/€
   Premium=$0.05 \times €1,000,000=€50,000.

   \[ \text{MaxGain} = \frac{1.23}{€} \times €1,000,000 - €50,000 = €1,180,000. \]

   \[ \text{Breakeven Spot Rate} = \frac{1.23}{€} - \frac{0.05}{€} - S(\$/€) = 0 \]
   And \[ S(\$/€) = \frac{1.18}{€}. \]
VII.
C. Continued

2. Account Receivable €1Milion in one year
   Buy puts on €1M with expiration in one year
   with X=$1.23/€.

   \[ \text{Premium} = \frac{0.08}{€} \times €1,000,000 = $80,000. \]

Max loss = $80,000
Breakeven spot = \( S($/€) - $1.23/€ = $0.08/€ \)
   \( S($/€) = $1.31/€ \)

Max Gain =?