Question I (also problem 7.7. in MSE)

Assume a call option on euros is written w/ a strike price of $0.9400/EUR at a premium of $0.0090/EUR and with an expiration date three months from now. The option is for EUR 100,000. Calculate the profit or loss should you exercise before maturity at a time when the euro is traded spot at:

a) At $0.90/EUR the call is not exercised since the option is OTM. The loss is then for $0.0090/EUR * EUR 100,000 = $900.

b) At $0.94/EUR the call is not exercised since the spot = the strike (ATM). Loss is $0.0090/EUR * EUR 100,000 = $900.

c) At $1.02/EUR the call is exercised for profit of ($1.02 – $ 0.94 – $ 0.009) /EUR * EUR 100,000 = $7,100.

Question II (also problem 7.9. in MSE)

Suppose you believe that the Canadian dollar (C$) will appreciate vs. the US$ over the coming 90 days. The current spot is $0.6750/C$. You may choose between the following options on the Canadian dollar:

<table>
<thead>
<tr>
<th>Option</th>
<th>Strike Price</th>
<th>Premium</th>
</tr>
</thead>
<tbody>
<tr>
<td>Put on C$</td>
<td>$0.70/ C$</td>
<td>$0.0003/C$</td>
</tr>
<tr>
<td>Call on C$</td>
<td>$0.70/ C$</td>
<td>$0.0247/C$</td>
</tr>
</tbody>
</table>

a. What option would you buy (call vs. put)?

Since we expect the Canadian $ to appreciate, we shall buy a call on C$. Why? This will allow to lock-in a low buying price on the C$.

b. Using the choice in (a), what is the break-even price?

The break-even price for a call is the total of the strike & premium, i.e. $0.70 + $0.0249 = $0.7249/C$.

c. Using the choice in (a), what are the gross and net profit (including the premium)

if the spot rate at the end of the 90 days is $0.76/C$?

If ending spot in 90 days is $0.76/C$, then gross profit (i.e. not accounting for the premium paid) is ($0.76 - $0.70)/C$ = $0.06/C$.

The net profit is the gross profit net of the cost of the premium, i.e. ($0.06 - $0.0247)C$ = $0.0353/C$.

d. Using the choice in (a), what are the gross and net profit (including the premium)

if the spot rate at the end of the 90 days is $0.825/C$?

If ending spot in 90 days is $0.825/C$, then gross profit (i.e. not accounting for the premium paid) is ($0.825 - $0.70)/C$ = $0.125/C$.

The net profit is the gross profit net of the cost of the premium, i.e. ($0.125 - $0.0247)C$ = $0.1003/C$. 

Question III (also problem 8.3. in MSE)

Plasti-Grip, Inc. of Georgia just purchased a Korean company that produces plastic nuts and bolts for automobile manufacture. The purchase price was for Won 7,030,000,000. Won 1,000,000,000 has already been paid and the remaining Won 6,030,000,000 is due in six months. The current spot rate is Won 1,200/ $, the six-month forward rate is Won 1,260/ $. Additional data:

<table>
<thead>
<tr>
<th>Interest Rate</th>
<th>Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Six-month Korean</td>
<td>16%</td>
</tr>
<tr>
<td>Six-month US</td>
<td>4%</td>
</tr>
<tr>
<td>Call option on won</td>
<td>3%</td>
</tr>
<tr>
<td>Put option on won</td>
<td>2.4%</td>
</tr>
</tbody>
</table>

Plasti-grip can invest at the rates given above or borrow at 2% per annum above those rates. Plasti-grip weighted average cost of capital is 25%.

1. Set up a money market hedge for the above account payable.

   Use the US$ today to purchase Korean won @ the current spot and invest the won received for six months in Korea. Final payment would be made w/ proceeds of investment. To find out the necessary value of the cost today you have to discount the Won 6,030 million principal for six months at the Korean interest rate for investment of 16%, and then find today’s dollar value of purchasing that amount of won:

   \[
   \frac{\text{Won} 6,030,000,000}{1 + \left( 0.16 \times \frac{180}{360} \right)} \times \frac{1}{\text{Won} 1,200/ \text{S}} = \$4,652,777.78.
   \]

   To compare this alternative w/ the other alternatives at the same point in time, the $ amount must be carried forward six months. The future dollar value in six months will be, using as a compounding rate the WACC of 25%,

   \[
   \$4,652,777.78 \times \left[ 1 + \left( 0.25 \times \frac{180}{360} \right) \right] = \$5,234,375.00.
   \]

2. Set up a forward market hedge for the above account payable.

   The entire payment of Won 6,030,000,000 could be covered at the forward rate of Won 1260/$, paying in six months:

   \[
   \frac{\text{Won} 6,030,000,000}{\text{Won} 1,260/ \text{S}} = \$4,785,714.29 \text{ for certain.}
   \]

3. Set up an option market hedge for the above account payable.

   Because the company has to obtain Korean won to make a future payment, it needs a call option on the won. The dollar cost today of purchasing a call on Won 6,030,000,000 at a premium of 3.0% is:
\[
\frac{\text{Won}6,030,000,000}{\text{Won1,200 / $}} \times 0.03 = $150,750.
\]

This cost, carried forward at WACC of 25% (or a factor 1.125 for six months) gives a future value of:

\[
$150,750 \times 1.125 = $169,593.75.
\]

If the option were to be exercised (the worst case outcome for a call option hedge) the final cost in six months would be:

\[
\frac{\text{Won}6,030,000,000}{\text{Won1,200 / $}} + $169,593.75 = $5,194,593.75.
\]

4. Compare the above hedges (in terms of costs). Which hedge would you recommend?

So, the three available alternatives are:

<table>
<thead>
<tr>
<th>Hedge</th>
<th>Cost</th>
<th>Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward contract hedge</td>
<td>Pay $4,785,714.29</td>
<td>Certain amount</td>
</tr>
<tr>
<td>Money market hedge (@WACC)</td>
<td>Pay $5,234,375</td>
<td>Certain amount</td>
</tr>
<tr>
<td>Call option hedge (worst case)</td>
<td>Pay $5,194,593.75</td>
<td>Maximum amount (only if exercised)</td>
</tr>
</tbody>
</table>

The forward contract hedge is the cheapest certain choice. If the Korean Won were expected to depreciate in the coming six months against the US$, & the company was willing to accept the call option hedge worst outcome (i.e. pay option premium but do not exercise it, in the event that the won this not fall in value), the call option could be the preferred choice over the forward.

**Question IV.**

Southcorp, one of the world’s largest premium-branded Australian wine producers, oftentimes would use transaction exposure hedges. Check their website, in particular, http://www.southcorp.com.au/presentations/FXexplanation0903.pdf, and then answer the following questions:

1. Briefly, what is the purpose of hedging forex risk at Southcorp?
   The purpose is to protect EBITDA from movements in the A$. 

2. What type of hedge (money market, forward market, option market) does Southcorp use?
   Southcorp uses predominantly forward market hedge.

3. Is the company using proportional hedges? Briefly explain what is a proportional hedge.
   Yes, the company uses proportional hedges. A proportional hedge is the use of forward contracts to hedge a percentage of the existing transaction exposure.