Hedging Exchange rate example

Assume a hedger locks in on a price in October with a European buyer that implies 50M Euro for a sale in December. The current spot EUR/USD exchange rate is 1.4704 (this implies that 1 Euro purchases $1.4704 in USD).

1. What is the implied sale worth in USD given the current exchange rate?

   =50,000,000*1.4704 = 73,520,000 = $73.52M

2. What is the value of the sale if the EUR/USD exchange rate:
   a. Declines to 1.3200

      =50M*1.320 = $66M (loss of $7.52M)

   b. Increases to 1.620

      =50M*1.620 = $81M (gain of $7.48M)

3. Consider a short hedge in the futures market, where the hedger goes short on 400 December futures contracts at 1.4605. Given that each contract is worth 125,000 Euro, the total value of 400 contracts is 50M Euro. What are the gains/losses if the EUR/USD exchange rate:
   a. Declines to 1.3200

      Futures contract is worth an increased value equal to $7.025M (=(1.4605-1.3200)*50M). The gain in value is because the contract is sold for 1.4605 and bought for 1.3200. This increased value leads to a net loss of 495,000 (=$7.025M - $7.52) due to basis.

   b. Increases to 1.620

      Futures contract is worth a decreased value equal to $7.975M (=(1.620-1.4605)*50M). The loss in value is because the contract is bought for 1.4605 and sold for 1.620. This decreased value leads to a net loss of 495,000 (=$7.48M - $7.975) due to basis.

4. Consider the use of puts to guard against downward exchange rate pressure. Assume the company purchases 400 at-the-money December puts with a strike price of 1.46 (with futures at 1.4605) for 0.0326.
   a. What is the initial cost

      =(400*125,000)*.0326 = 1,630,000

b. What is the gain/loss if the rate decreases to 1.32

The put pays out $7M (=(1.46-1.32)*(400*125,000)), which after the initial cost leads to a net gain of $5.37M in the value of the contract. This partially offsets the loss in asset value of $7.52M, leading to a net profit of $-2.15M (=$5.32M - $7.52M).

c. What is the gain/loss if the rate increases to 1.64

The put is not exercise since the price is above the strike. Therefore after the initial cost, the net profit is $5.85M (=$7.48-$1.63M).

	Decreases to 1.32	No change	Increases to 1.62
Unhedged	-$7.520M	-$0.020M	+$7.480M
Short futures hedge	-$0.495M	-$0.495M	-$0.495M
Long put hedge	-$2.150M	-$1.650M	+$5.850M