HW4

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1. (70 points) Boeing just signed a contract to sell a Boeing 787 aircraft to British Airways. British Airways will be billed £26 million which is payable in one year. The current spot exchange rate is \$1.40/£ and the one-year forward rate is \$1.43/£. The annual interest rate is 6.0% in the U.S. and 5.0% in UK. The premium for a one-year put or call option with the exercise rate of \$1.43/£ is 1%. Boeing is concerned with the volatile exchange rate between the dollar and the pound and would like to hedge exchange exposure. Four alternatives are available to Boeing to manage the exposure: 1) remain unhedged; 2) hedge in the forward market; 3) hedge in the money market; or 4) hedge in the options market.
   A. What action does Boeing need to take for each hedging alternative?

1) Forward Hedge: Take short position on forward contract. Sell 26M GBP @ 1.43 $\frac{USD}{GBP}$
2) Money Market Hedge: Borrow GBP at value of (26M/(1+5%)) = 24,761,904.76 GBP @ 5%.
   - Convert to USD @ 1.4 $\frac{USD}{GBP}$ and invest 34,666,666.67 @ 6%
3) Option Hedge: Buy Put option to sell 26M GBP with strike price of 1.43
   - Premium cost = 26M × 1.4 × .01 = 364,000 USD

   B. Calculate the future dollar proceeds of the sale to British Airway under the four alternatives if the spot exchange rate becomes \$1.45/£ in one year.

1) Unhedged: 26M × 1.45 = $\boxed{37,700,000}$ USD
2) Forward Hedge: 26 M × 1.43 = $\boxed{37,180,000}$ USD
3) Money-Market Hedge: 34,666,666.67 × $(1+.06)^1$ = $\boxed{36,746,666.67}$ USD
4) Option Hedge: 26M × 1.45 − (364,000 × 1.06) = $\boxed{37,314,160}$ USD

   C. Calculate the future dollar proceeds of the sale to British Airway under the four alternatives if the spot exchange rate becomes \$1.40/£ in one year.

1) Unhedged: 26 M × 1.40 = $\boxed{36,400,000}$ USD
2) Forward Hedge: 26M × 1.43 = $\boxed{37,180,000}$ USD
3) Money-Market Hedge: 34,666,666.67 × $(1+.06)^1$ = $\boxed{36,746,666.67}$ USD
4) Option Hedge: 26M × 1.43 − (364,000 × 1.06) = $\boxed{36,794,160}$ USD

   D. At what future spot exchange do you think Boeing will be indifferent between the option and money market hedge?

$26M \times S_1 - 385,840 = 36,746,666.67$

$26M \times S_1 = 37132506.67$

$\boxed{S_1 = 1.428}$

Break-even rate is lower than strike price; therefore, there is no spot rate that will make Boeing indifferent.

   E. At what future spot exchange do you think Boeing will be indifferent between the option forward hedge?

$26M \times S_1 - 385,840 = 37,180,000$

$26M \times S_1 = 37,565,840$

$\boxed{S_1 = 1.445}$

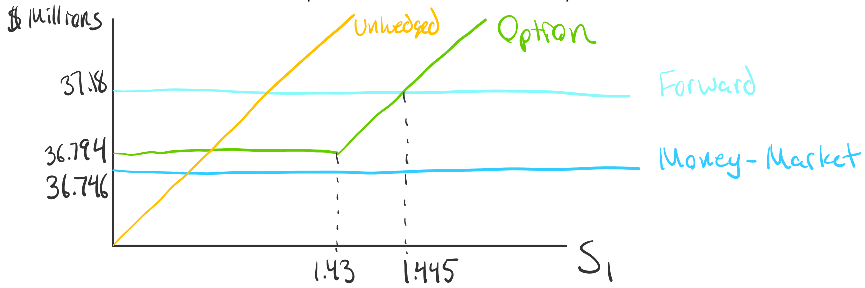
   F. At what dollar interest rate do you think Boeing will be indifferent between the forward and money market hedge?

$34,666,666.67 \times (1+i) = 37,180,000$

$1+i = 1.0725$

$i = .0725 \Rightarrow$ $\boxed{\text{Break-Even } i = 7.25\%}$

G. Illustrate the future dollar proceeds of the sale to British Airway under the four alternatives.



2. (30 points) Calculate the **cumulative translation adjustment (CTA)** for this U.S. MNC translating the balance sheet and income statement of a French subsidiary, which keeps its books in euro, but that is translated into U.S. dollars using the current rate method, the reporting currency of the U.S. MNC. The subsidiary is at the end of its first year of operation. The historical exchange rate is \$1.60/€1.00 and the most recent exchange rate is \$1.50/€. The average exchange rate is \$1.55/€.

Balance Sheet	Local Currency	Current Rate:
Cash	€ 2,100	3150
Inventory (Current Value = €1800)	€ 1,500	2250
Net fixed assets	€ 3,000	4500
Total Assets	€ 6,600	9900
Current liabilities	€ 1,200	1800
Long-term debt	€ 1,800	2700
Common stock	€ 2,700	4320
Retained earnings	€ 900	1395
CTA		CTA: -315 ★
Total L&E	€ 6,600	9900
Income Statement		
Sales Revenue	€ 10,000	15500
COGS	€ 7,500	11625
Depreciation	€ 1,000	1550
NOI	€ 1,500	2325
Tax (40%)	€ 600	930
Profit after tax	€ 900	1395
Foreign Exchange gain (loss)		N/A
Net Income	€ 900	1395
Dividends	€ 0	0
Addition to Retained Earnings	€ 900	1345

Cumulative translation adjustment:

$\boxed{-315}$