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Problem statement: The company faces foreign exchange exposure from a €8,000,000 receivable due in one year. USD proceeds are at risk if the euro weakens against the dollar. The primary risk is that a declining EUR/USD spot rate will reduce the USD cash inflow, potentially impacting profit and cash flow planning. This analysis evaluates hedging strategies to mitigate this FX risk.

1. Objective

- To model USD proceeds from a €8,000,000 receivable under three hedging strategies: forward contract, money-market hedge, and EUR put option as well as identify which hedge best protects revenue and exchange rate fluctuations.

2. Scope

- In Scope:
 - One-year hedging analysis
 - Forward, money-market, and EUR put option
 - Sensitivity analysis using different future EUR/USD spot rates
- Out-of-scope:
 - Multi-year hedges or swaps
 - Forecasting foreign exchange rates or interest rates
 - Transaction costs

3. Inputs

| Input | Value | Description |
|----------------------------------------|-----------|-----------------------|
| Receivable | 8,000,000 | Amount in EUR |
| Spot EUR/USD (S) | 1.17 | Current spot rate |
| Forward EUR/USD (F) | 1.0890 | One-year forward rate |
| USD 1-year interest rate (i_{USD}) | 0.0425 | From memo |
| EUR 1-year interest rate (i_{EUR}) | 0.0215 | From memo |

| | | |
|----------------------------------------------------|---------|--------------------------|
| Option strike (K) | 1.17 | Set near current spot |
| Option premium (P) | 0.021 | Per euro |
| Scenario future spot rates (S_{future}) | Various | For sensitivity analysis |

- Forward rate formula: $\text{SpotRate} * (1 + \text{USD_Rate}) / (1 + \text{EUR_Rate})$

4. Assumptions & Constraints

- Interest rates are based on annualized simple rates (USD 4.25%, EUR 2.15%).
- Transaction costs, bid-ask spreads, and taxes are ignored.
- Hedging strategies assume access to standard market instruments (forwards, money-market loans, options).
- The option is European style and can only be exercised at maturity.
- Future spot rates are hypothetical for sensitivity analysis; actual market movements may vary.

5. Workflow/Steps

- Set up Inputs section in Excel
- Forward hedge: $8000000 * \text{ForwardRate}$
- Money-market hedge: $(8000000 / (1 + \text{EUR_Rate})) * \text{SpotRate} * (1 + \text{USD_Rate})$
- Option hedge: $= \text{MAX}(\text{Strike} - \text{FutureSpot}, 0) * 8000000 - (\text{Premium} * 8000000)$
- Unhedged position: $= 8000000 * \text{FutureSpot}$
- Build a summary table comparing USD proceeds for all hedge options.
- Run sensitivity analysis using multiple FutureSpot values (e.g., 1.05, 1.10, 1.20).
- Perform sensitivity analysis by varying future EUR/USD spot rates (e.g., 1.05, 1.10, 1.20) to observe the impact on USD proceeds for each hedge strategy. Results should be visualized in a chart to highlight the effectiveness of each hedge across different exchange-rate scenarios.

6. Expected outputs

| Hedge | USD Proceeds | Excel Formula |
|---------|-------------------------|-------------------------------|
| Forward | 8000000×1.0890 | $=8000000*\text{ForwardRate}$ |

| | | |
|--------------|---------------------------------------------------------------------------|-------------------------------------------------------|
| Money Market | $(8,000,000 \div (1+0.0215)) \times 1.17 \times (1+0.0425)$ | $=(8000000/(1+EUR_Rate))*SpotRate*(1+USD_Rate)$ |
| Option | $\max(1.17 - S(\{future\}), 0) \times 8,000,000 - 0.021 \times 8,000,000$ | $=MAX(Strike-FutureSpot,0)*8000000-(Premium*8000000)$ |
| Unhedged | $8,000,000 \times S(\{future\})$ | $=8000000*FutureSpot$ |

7. Evaluation Criteria

- Accuracy: Formulas produce correct USD proceeds
- Clarity: Inputs, calculations, and tables are clearly labeled
- Reproducibility: Results can be replicated using the same inputs
- Visualization: Tables/charts are labeled and readable
- Alignment: Model follows class examples and defines hedge types correctly

8. AI Prompts

- “Create an Excel spreadsheet that calculates USD proceeds from a €8,000,000 receivable using forward, money-market, and EUR put option hedges, with editable inputs and a summary table.”
- “Explain the difference between forward, money-market, and option hedges in simple terms for MBA students.”
- “Generate Excel formulas to calculate net USD proceeds for each hedge given spot, forward, interest rates, strike, and premium inputs.”