

Triangular Arbitrage: Full Teaching Module

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Exercise 1: Profitable Triangular Arbitrage

- Market Rates:
 - - $\text{EUR/USD} = 1.10$
 - - $\text{USD/JPY} = 110$
 - - $\text{EUR/JPY} = 100$
- Tasks:
 1. Identify if arbitrage exists.
 2. Determine the transaction path.
 3. Compute the arbitrage profit starting with



Analytical Solution – Exercise 1

- Implied Cross Rate:
- $\text{EUR/JPY}_{\text{implied}} = 1.10 \times 110 = 121$
- Direct EUR/JPY = 100 \rightarrow Mispricing.
- Correct Arbitrage Path:
- EUR \rightarrow USD \rightarrow JPY \rightarrow EUR
- Steps:
- 1. EUR \rightarrow USD: $1,000,000 \times 1.10 = 1,100,000$

Explaining the Profit Path

- Key Mispricing:
- $\text{EUR/JPY via USD} = 121 \neq \text{Direct EUR/JPY} = 100$
- Why This Generates Profit:
 - 1. EUR is OVERVALUED via USD \rightarrow Sell EUR there.
 - 2. Receive too much JPY.
 - 3. EUR is UNDERVALUED directly \rightarrow Buy EUR cheap.

Rules: Overvalued vs Undervalued Currencies

-  When a currency is OVERVALUED:
- SELL it in the market where it is overpriced.
-  When a currency is UNDERVALUED:
- BUY it in the market where it is cheap.
- Triangular Arbitrage Logic:
- SELL overvalued → BUY undervalued → Close the loop → Profit.

Exercise 2: Wrong Transaction Path

- Same Rates as Exercise 1.
- Incorrect Path:
- $\text{EUR} \rightarrow \text{JPY} \rightarrow \text{USD} \rightarrow \text{EUR}$
- Tasks:
 - 1. Compute final EUR amount.
 - 2. Explain why this is not arbitrage.
 - 3. Compare with the correct path.

Analytical Solution – Exercise 2

- Wrong Path: EUR \rightarrow JPY \rightarrow USD \rightarrow EUR
- Steps:
- 1. EUR \rightarrow JPY: $1,000,000 \times 100 = 100,000,000$
JPY
- 2. JPY \rightarrow USD: $100,000,000 / 110 \approx 909,090.91$
USD
- 3. USD \rightarrow EUR: $909,090.91 / 1.10 \approx 826,446.28$
EUR