

# Management of Transaction Exposure

# 13

## Chapter Objective:

This chapter discusses various methods available for the management of transaction exposure facing multinational firms.

# Chapter Outline

- Forward Market Hedge
- Money Market Hedge
- Options Market Hedge
- Cross-Hedging Minor Currency Exposure
- Hedging Contingent Exposure
- Hedging Recurrent Exposure with Swap Contracts

## Chapter Outline (continued)

- Hedging Through Invoice Currency
- Hedging via Lead and Lag
- Exposure Netting
- Should the Firm Hedge?
- What Risk Management Products do Firms Use?

# Forward Market Hedge

- If you are going to *owe* foreign currency in the future, agree to *buy* the foreign currency now by entering into long position in a forward contract.
- If you are going to *receive* foreign currency in the future, agree to *sell* the foreign currency now by entering into short position in a forward contract.

# Forward Market Hedge: an Example

You are a U.S. importer of British woolens and have just ordered next year's inventory. Payment of £100M is due in one year.

Question: How can you fix the cash outflow in dollars?

Answer: One way is to put yourself in a position that delivers £100M in one year—a long forward contract on the pound.

# Money Market Hedge

- This is the same idea as covered interest arbitrage

# Money Market Hedge

The importer of British woolens can hedge his £100 million payable with a money market hedge:

Borrow \$112.05 million in the U.S.

Translate \$112.05 million into pounds at the spot rate  $S(\$/\pounds)$   
= \$1.25/£

Invest £89.64 million in the UK at  $i_{\pounds} = 11.56\%$  for one year.

In one year your investment will have grown to £100 million.

Spot exchange rate	$S(\$/\pounds)$	=	\$1.25/£
360-day forward rate	$F_{360}(\$/\pounds)$	=	\$1.20/£
U.S. discount rate	$i_{\$}$	=	7.10%
British discount rate	$i_{\pounds}$	=	11.56%

# Money Market Hedge

Where do the numbers come from?

We owe our supplier £100 million in one year—so we know that we need to have an investment with a future value of £100 million. Since  $i_{\text{£}} = 11.56\%$  we need to invest £89.64 million at the start of the year.

$$\text{£}89.64 = \frac{\text{£}100}{1.1156}$$

How many dollars will it take to acquire £89.64 million at the start of the year if the spot rate  $S(\$/\text{£}) = \$1.25/\text{£}$ ?

$$\$112.05 = \text{£}89.64 \times \frac{\$1.00}{\text{£}1.25}$$

# Money Market Hedge

Suppose you want to hedge a payable in the amount of  $\pounds y$  with a maturity of  $T$ :

i. Borrow  $\$x$  at  $t = 0$  on a loan at a rate of  $i_{\$}$  per year.

(Note that  $\$x = \pounds y / (1 + i_{\pounds})^T$  at the spot rate.)

ii. Exchange  $\$x$  for  $\pounds y / (1 + i_{\pounds})^T$  at the prevailing spot rate, invest  $\pounds y / (1 + i_{\pounds})^T$  at  $i_{\pounds}$  for the maturity of the payable to achieve  $\pounds y$ .

At maturity, you will owe a  $\$x(1 + i_{\$})$ .

Your British investments will have grown enough to service your payable and you will have no exposure to the pound.

# Money Market Hedge

Suppose you want to hedge a £ receivable in the amount of £ $y$  with a maturity of  $T$ :

- i. Borrow  $£y/(1+i_{£})^T$  at  $t = 0$ .
- ii. Exchange  $£y/(1+i_{£})^T$  for \$ $x$  at the prevailing spot rate.

At maturity, you will owe a \$ $y$  which can be paid with your receivable.

You will have no exposure to the dollar-pound exchange rate.

# Options Market Hedge

- Options provide a flexible hedge against the downside, while preserving the upside potential.
- To hedge a foreign currency payable buy calls on the currency.
  - If the currency appreciates, your call option lets you buy the currency at the exercise price of the call.
- To hedge a foreign currency receivable buy puts on the currency.
  - If the currency depreciates, your put option lets you sell the currency for the exercise price.

# Cross-Hedging

## Minor Currency Exposure

- The major currencies are the: U.S. dollar, Canadian dollar, British pound, French franc, Swiss franc, Mexican peso, Italian lira, German mark, Japanese yen, and now the euro.
- Everything else is a minor currency, like the Polish zloty.
- It is difficult, expensive, or impossible to use financial contracts to hedge exposure to minor currencies.

# Cross-Hedging

## Minor Currency Exposure

- Cross-Hedging involves hedging a position in one asset by taking a position in another asset.
- The effectiveness of cross-hedging depends upon how well the assets are correlated.
  - An example would be a U.S. importer with liabilities in Czech koruna hedging with long or short forward contracts on the euro. If the koruna is expensive when the euro is expensive, or even if the koruna is cheap when the euro is expensive it can be a good hedge. But they need to co-vary in a predictable way.

# Hedging Contingent Exposure

- If only certain contingencies give rise to exposure, then options can be effective insurance.
- For example, if your firm is bidding on a hydroelectric dam project in Canada, you will need to hedge the Canadian-U.S. dollar exchange rate only if your bid wins the contract. Your firm can hedge this contingent risk with options.

# Hedging Recurrent Exposure with Swaps

- Recall that swap contracts can be viewed as a portfolio of forward contracts.
- Firms that have recurrent exposure can very likely hedge their exchange risk at a lower cost with swaps than with a program of hedging each exposure as it comes along.
- It is also the case that swaps are available in longer-terms than futures and forwards.

# Hedging through Invoice Currency

- The firm can *shift, share, or diversify*:
  - shift exchange rate risk
    - ◆ by invoicing foreign sales in home currency
  - share exchange rate risk
    - ◆ by pro-rating the currency of the invoice between foreign and home currencies
  - diversify exchange rate risk
    - ◆ by using a market basket index

# Hedging via Lead and Lag

- If a currency is appreciating, pay those bills denominated in that currency early; let customers in that country pay late as long as they are paying in that currency.
- If a currency is depreciating, give incentives to customers who owe you in that currency to pay early; pay your obligations denominated in that currency as late as your contracts will allow.

# Exposure Netting

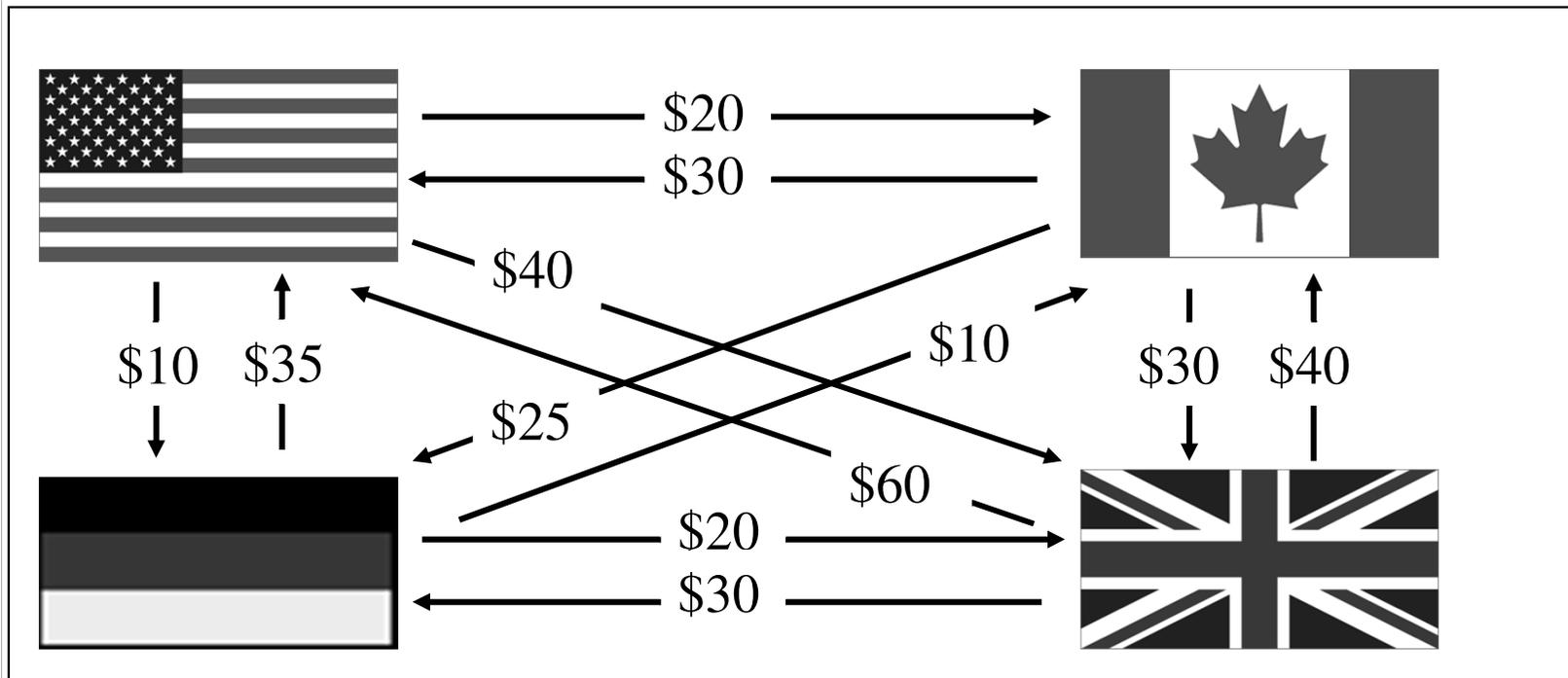
- A multinational firm should not consider deals in isolation, but should focus on hedging the firm as a *portfolio of currency positions*.
  - As an example, consider a U.S.-based multinational with Korean won receivables and Japanese yen payables. Since the won and the yen tend to move in similar directions against the U.S. dollar, the firm can just wait until these accounts come due and just buy yen with won.
  - Even if it's not a perfect hedge, it may be too expensive or impractical to hedge each currency separately.

# Exposure Netting

- Many multinational firms use a **reinvoice center**. Which is a financial subsidiary that nets out the intrafirm transactions.
- Once the residual exposure is determined, then the firm implements hedging.

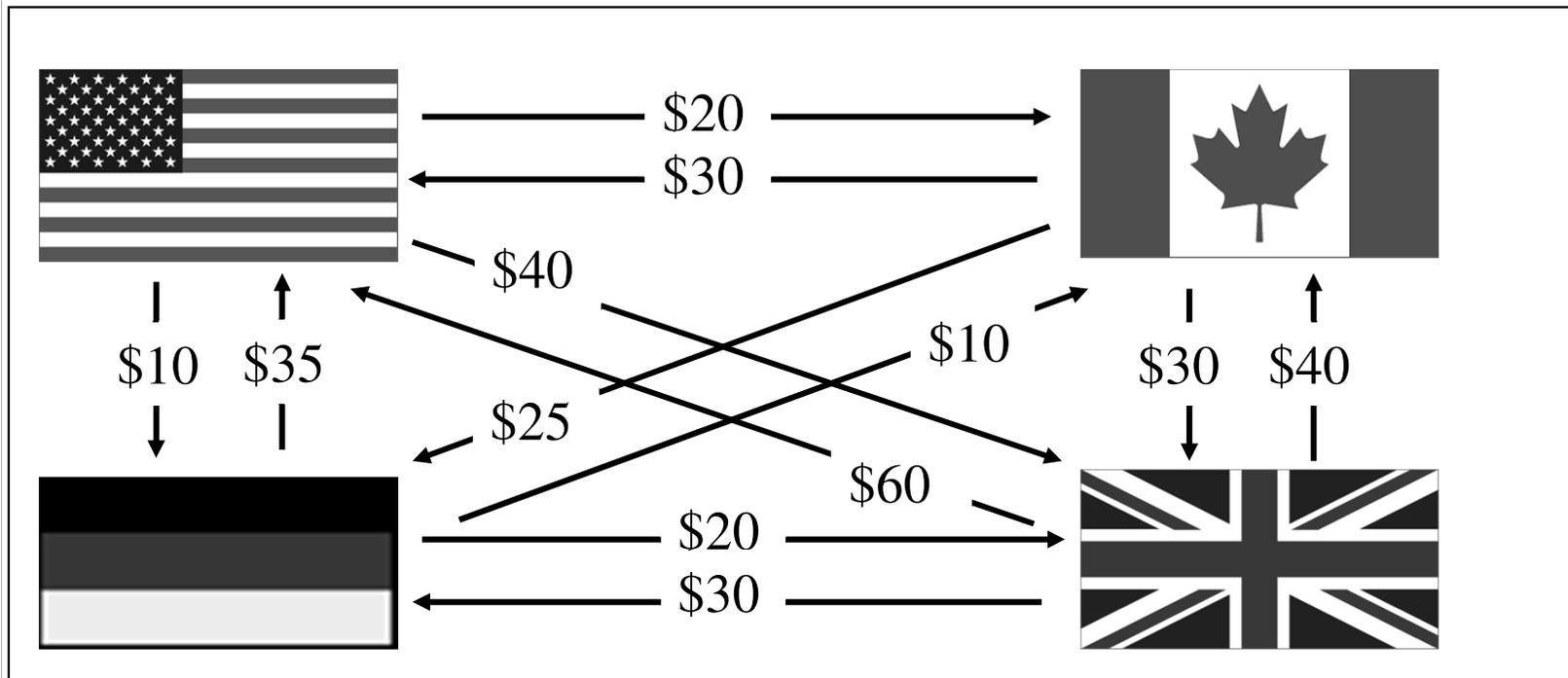
# Exposure Netting: an Example

Consider a U.S. MNC with three subsidiaries and the following foreign exchange transactions:



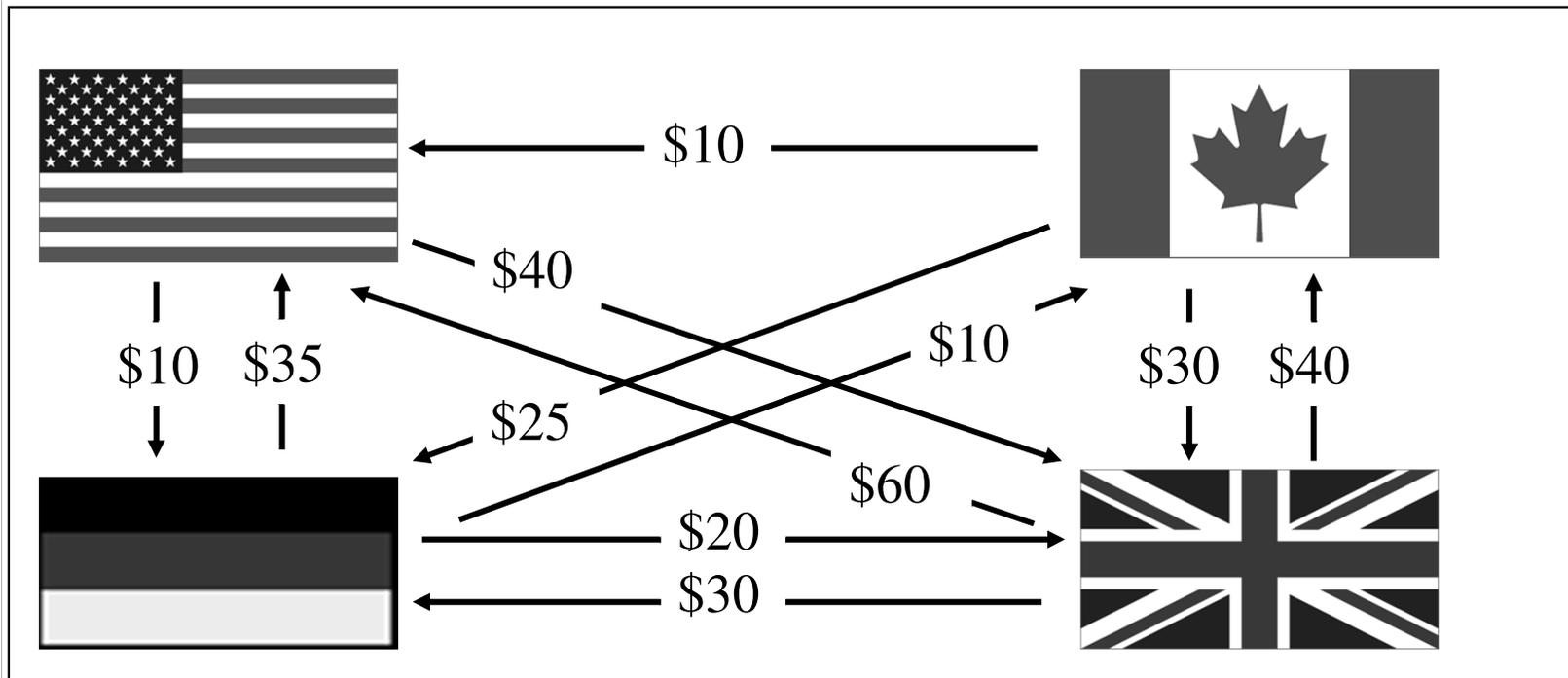
# Exposure Netting: an Example

Bilateral Netting would reduce the number of foreign exchange transactions by half:



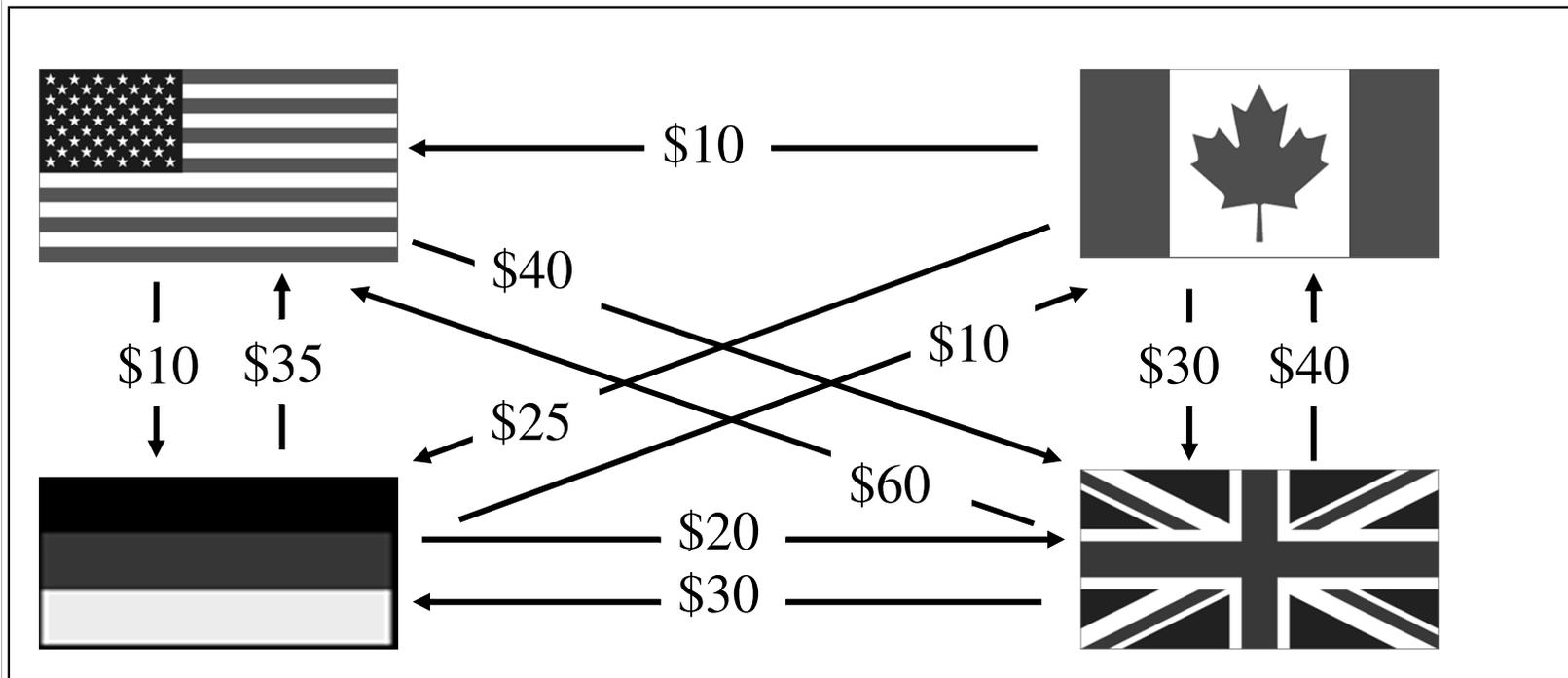
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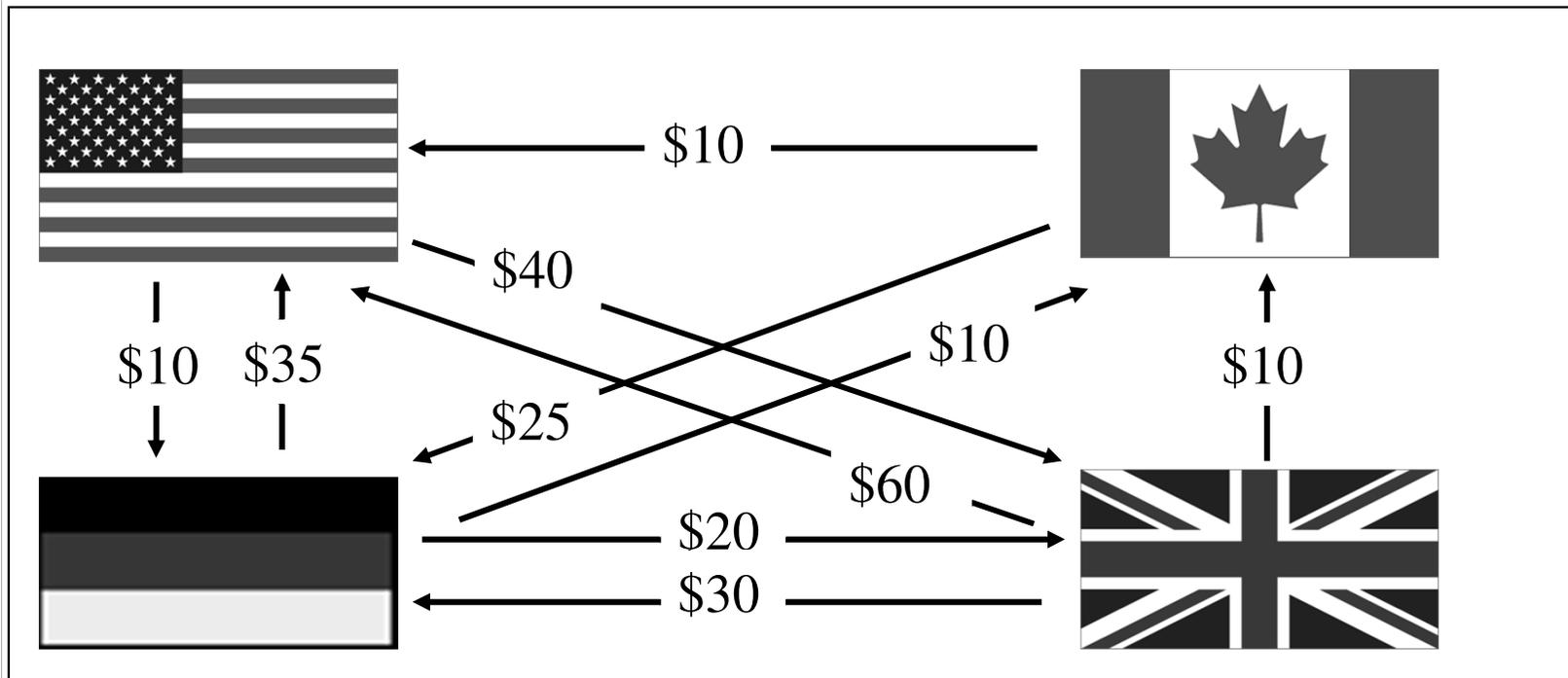
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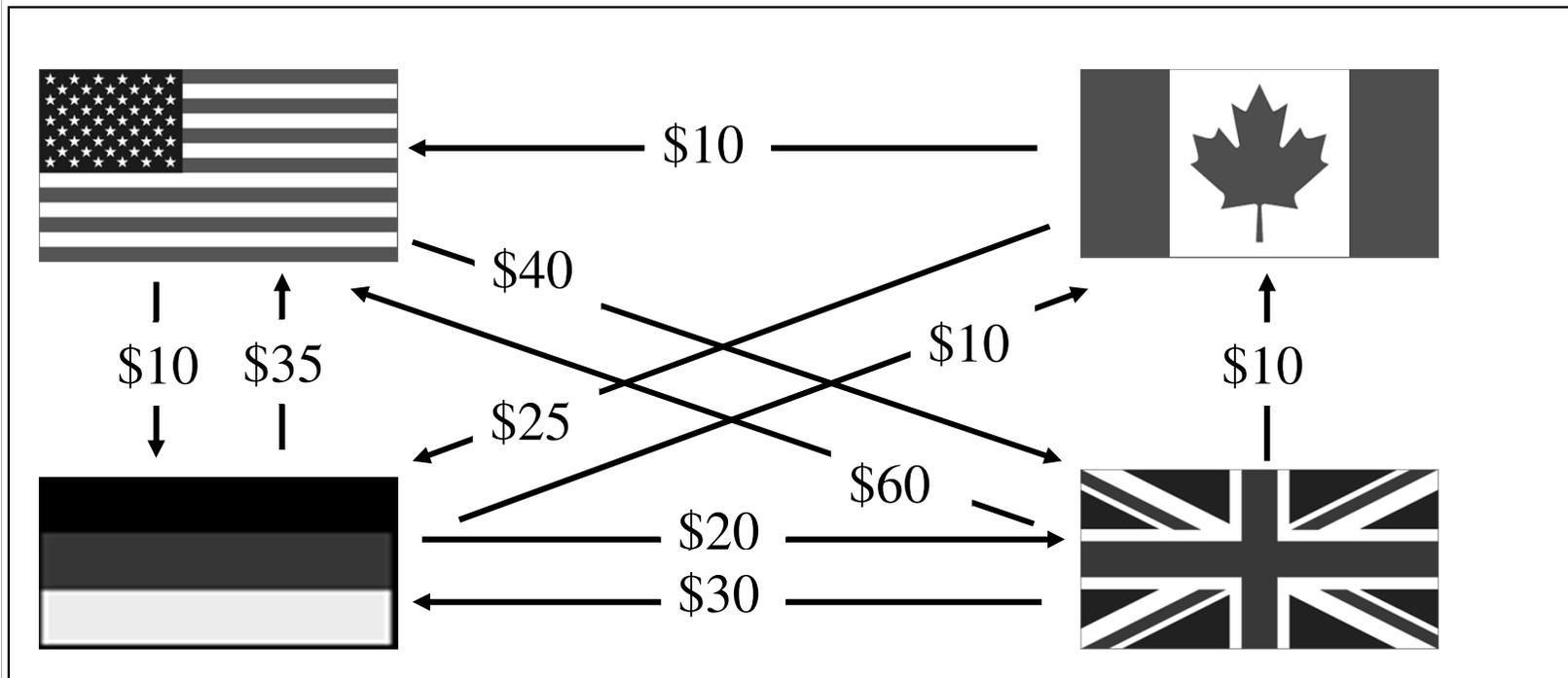
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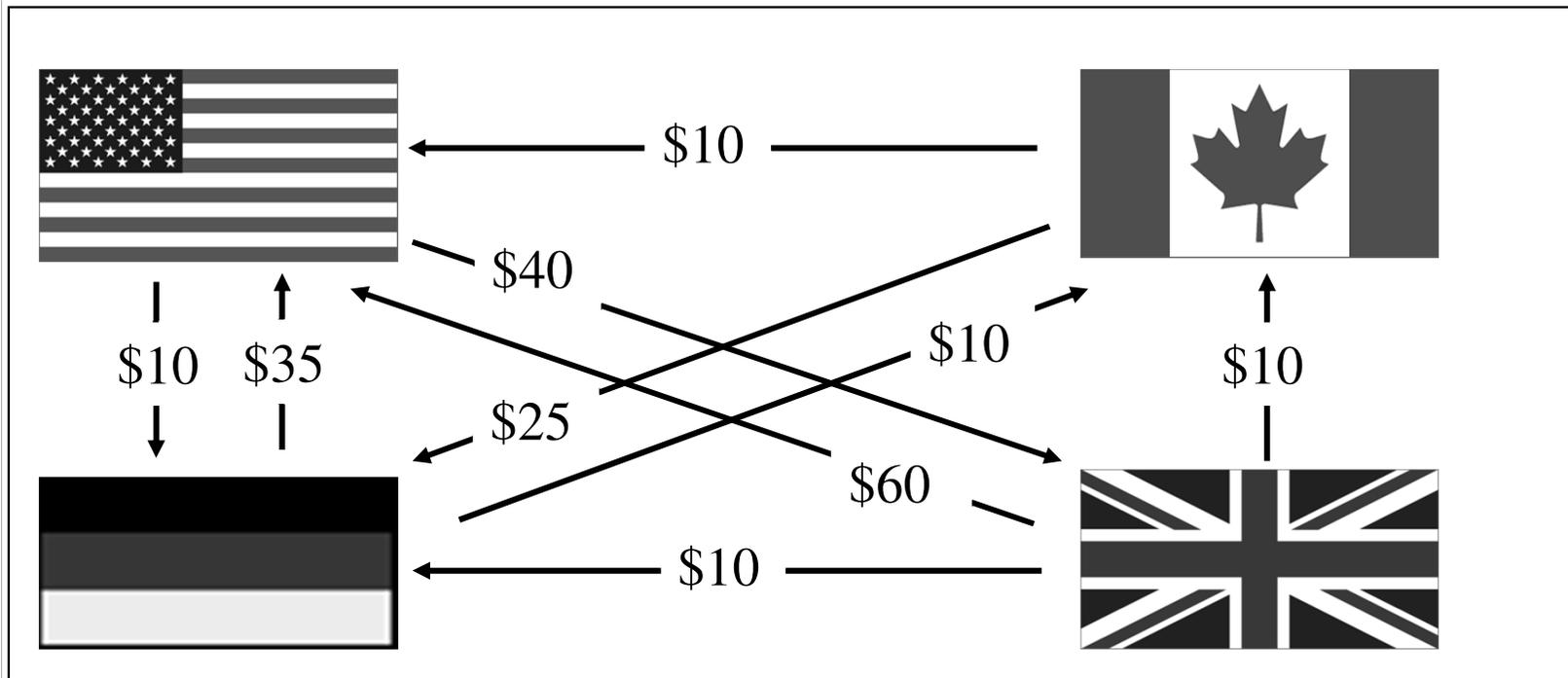
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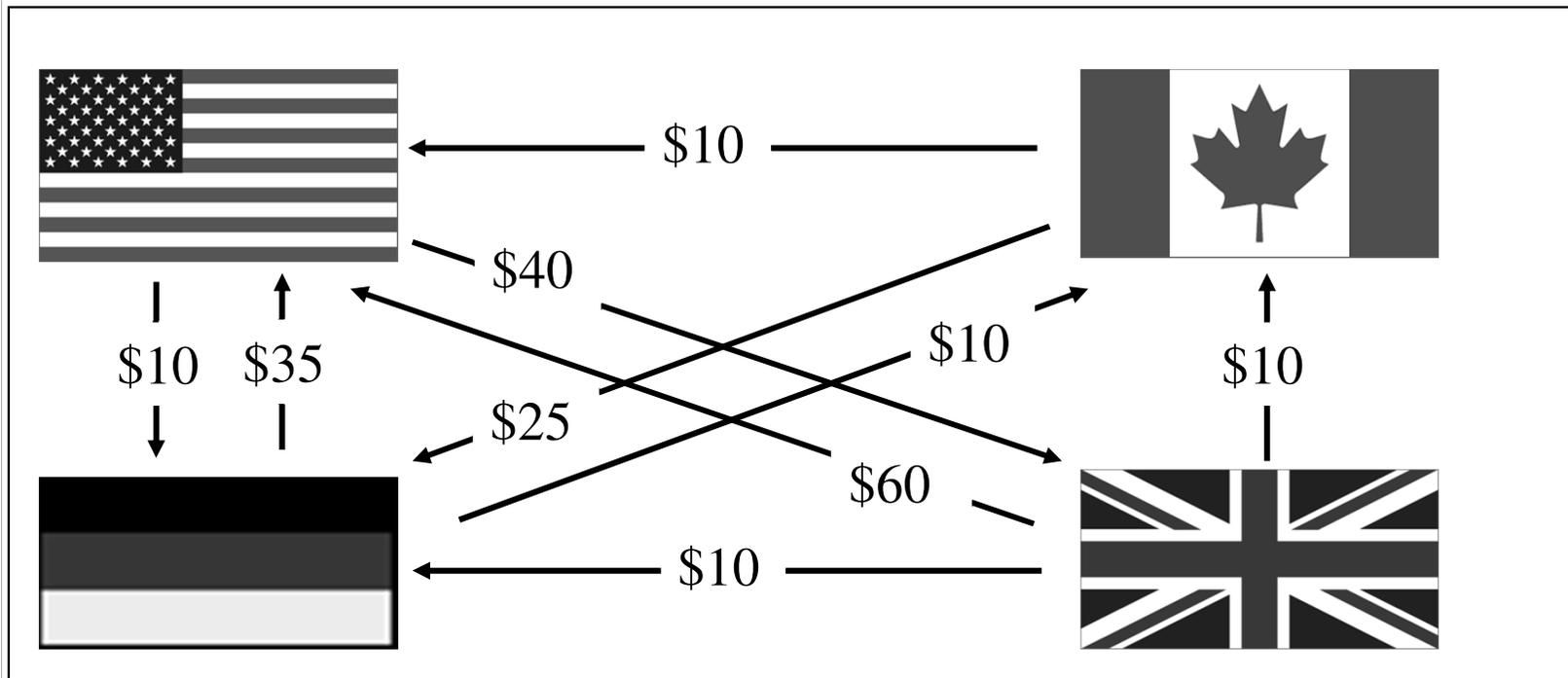
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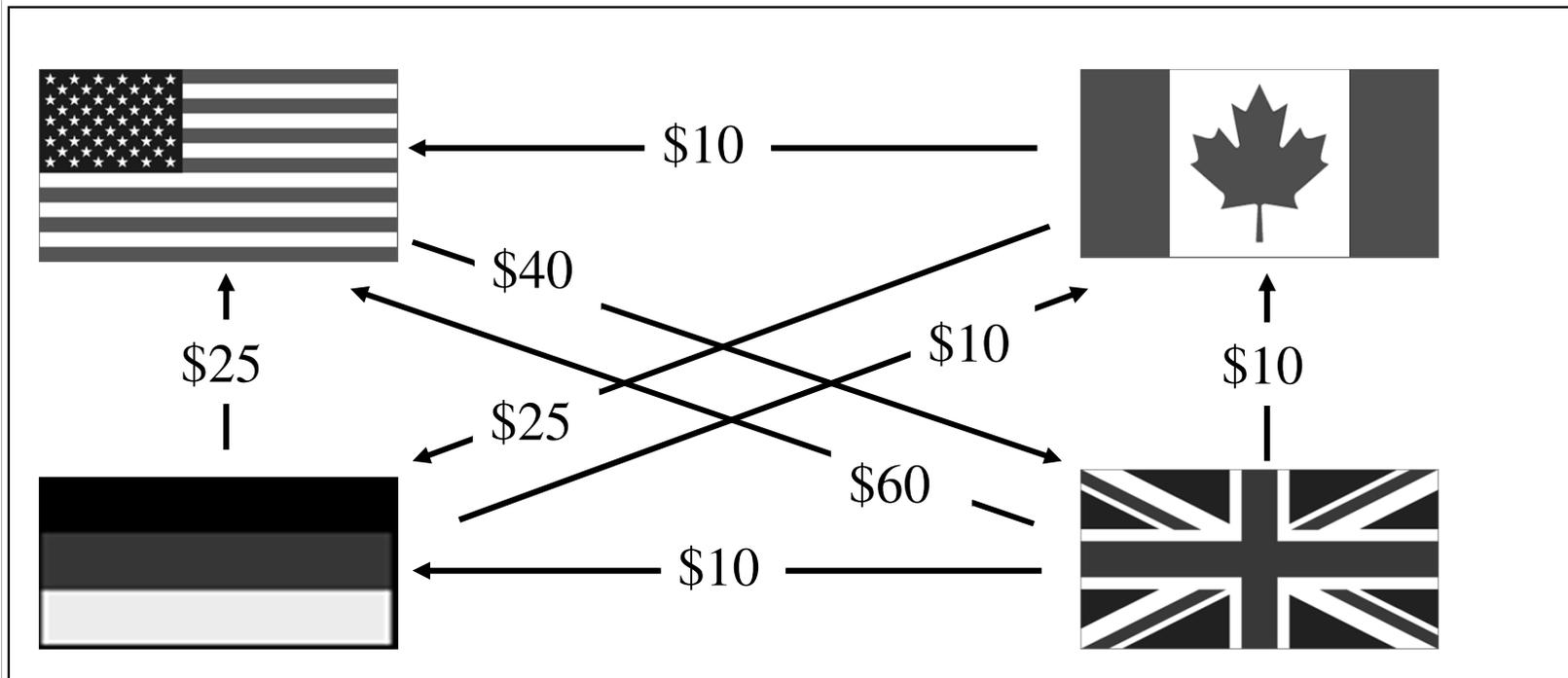
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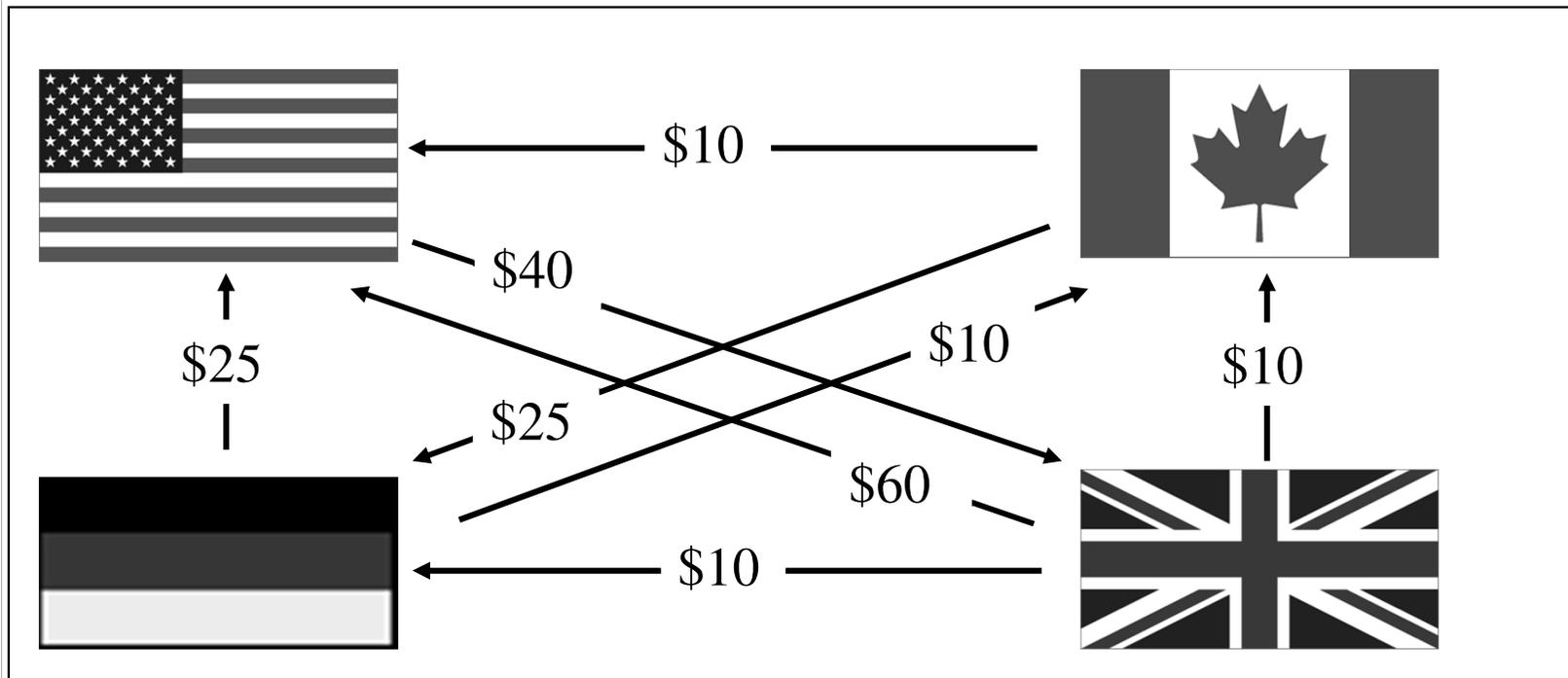
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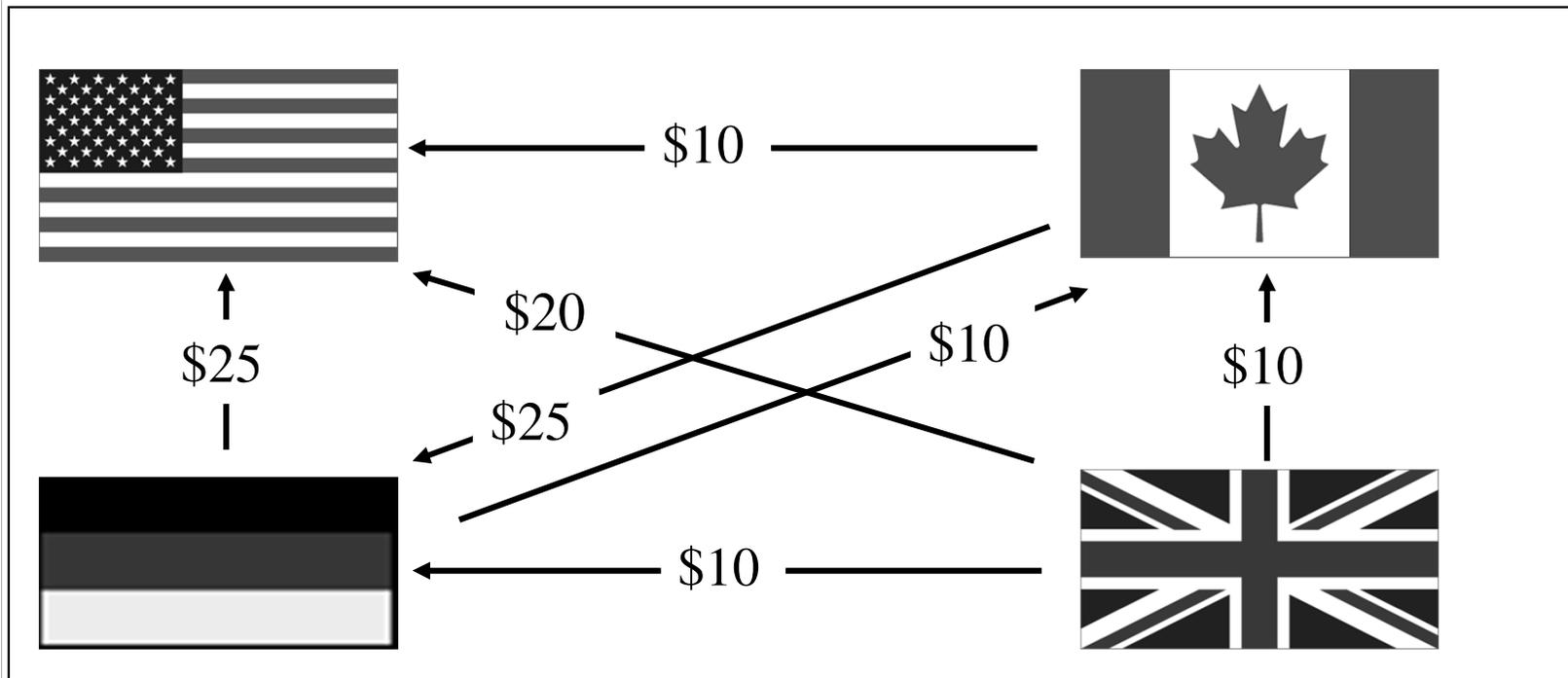
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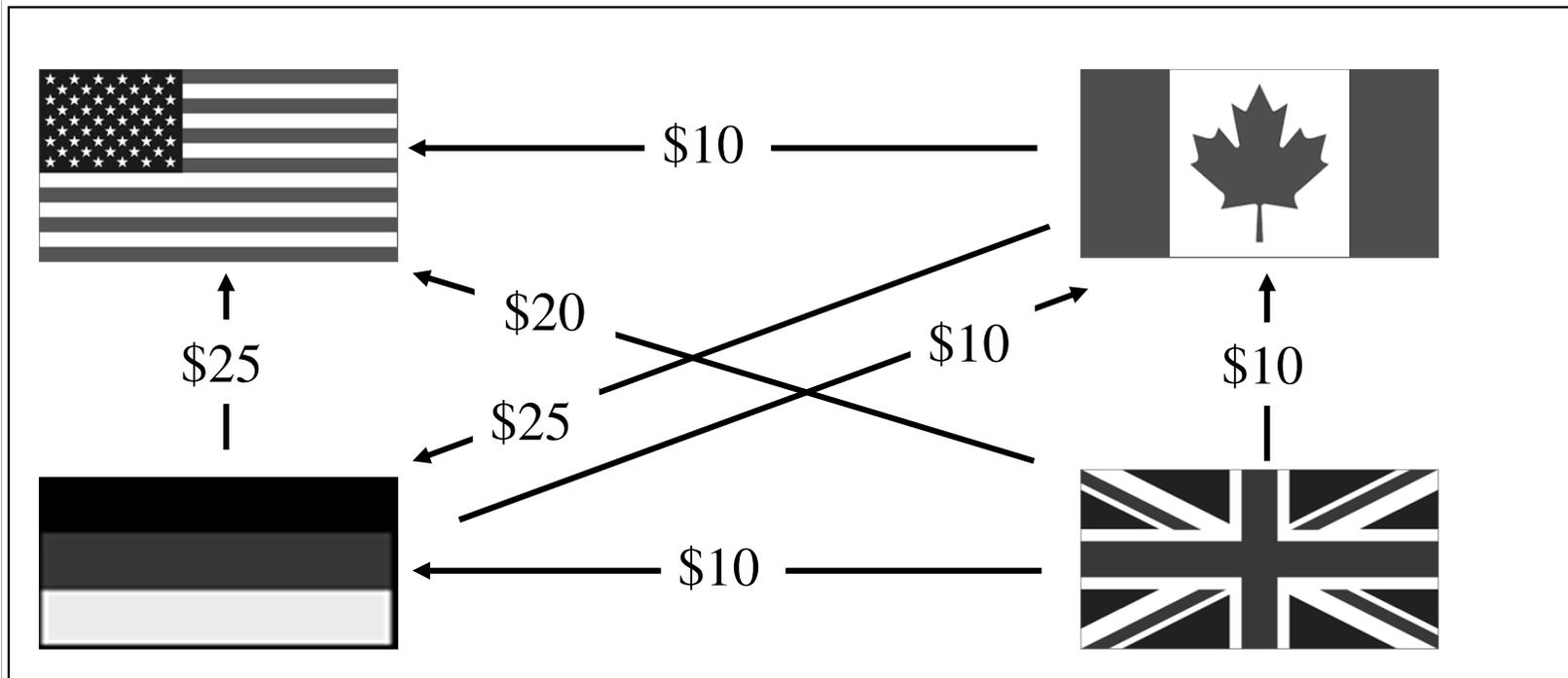
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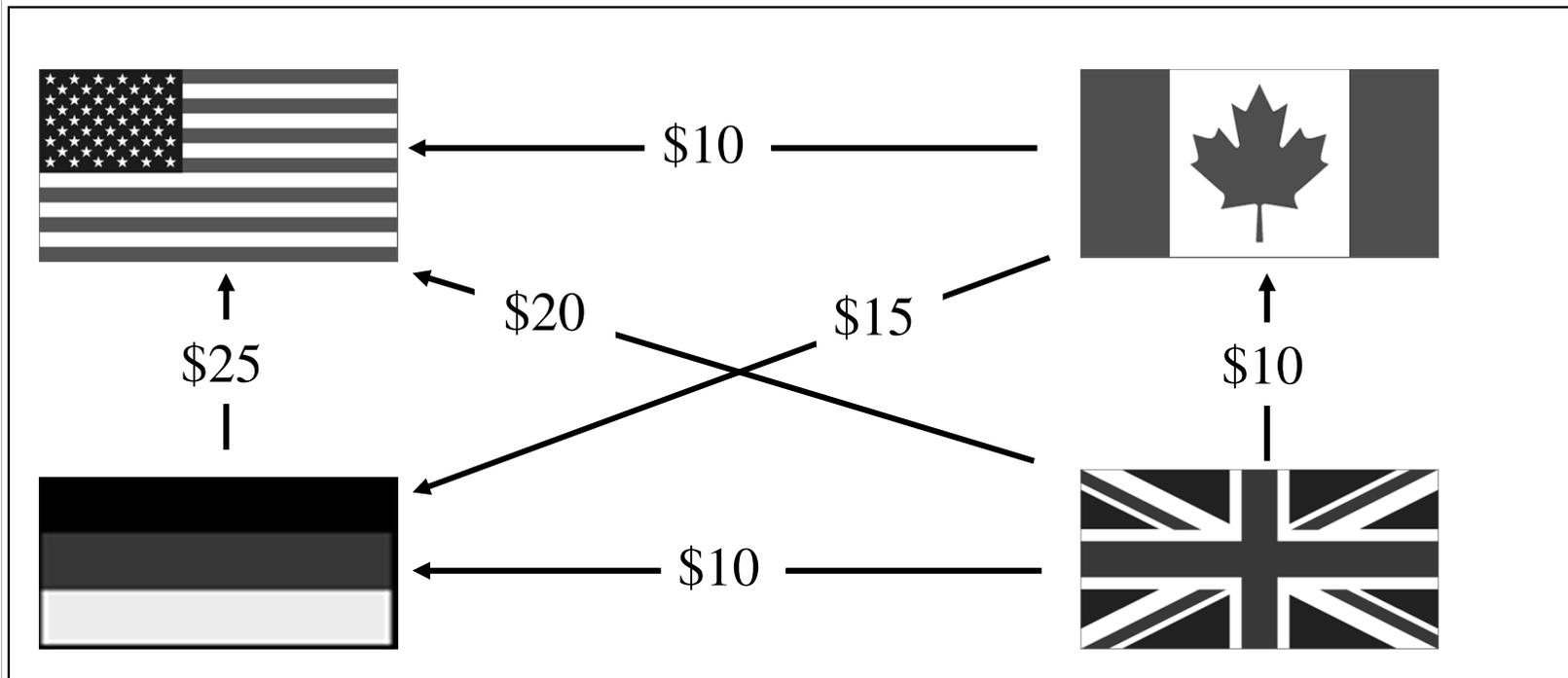
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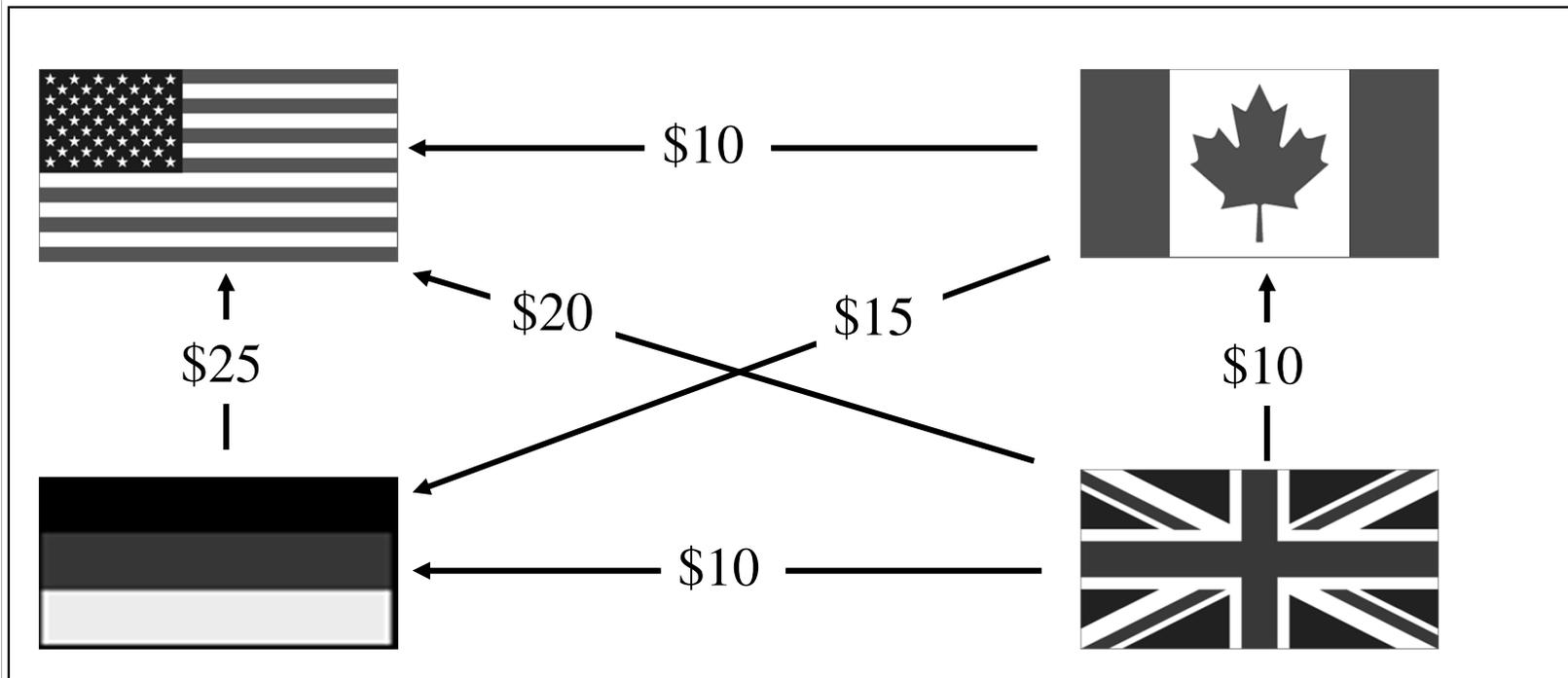
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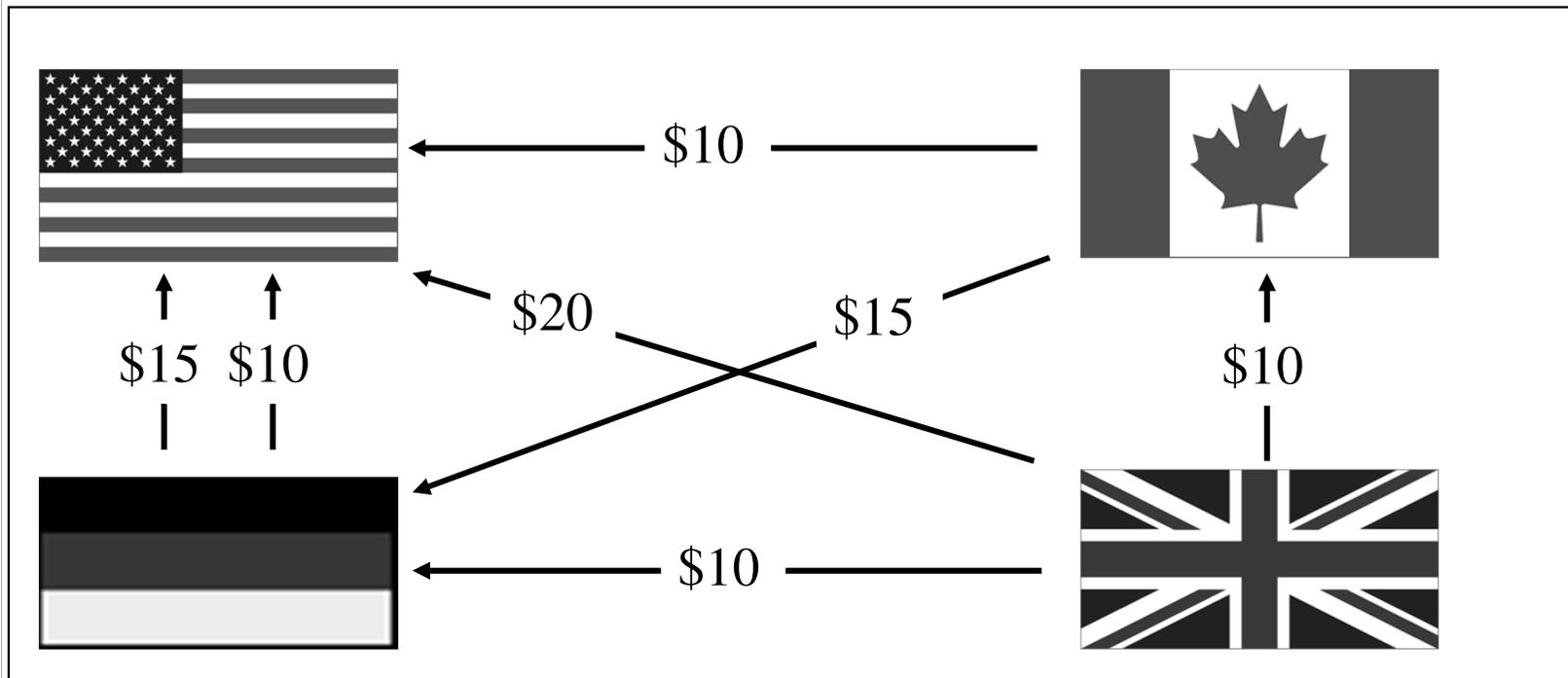
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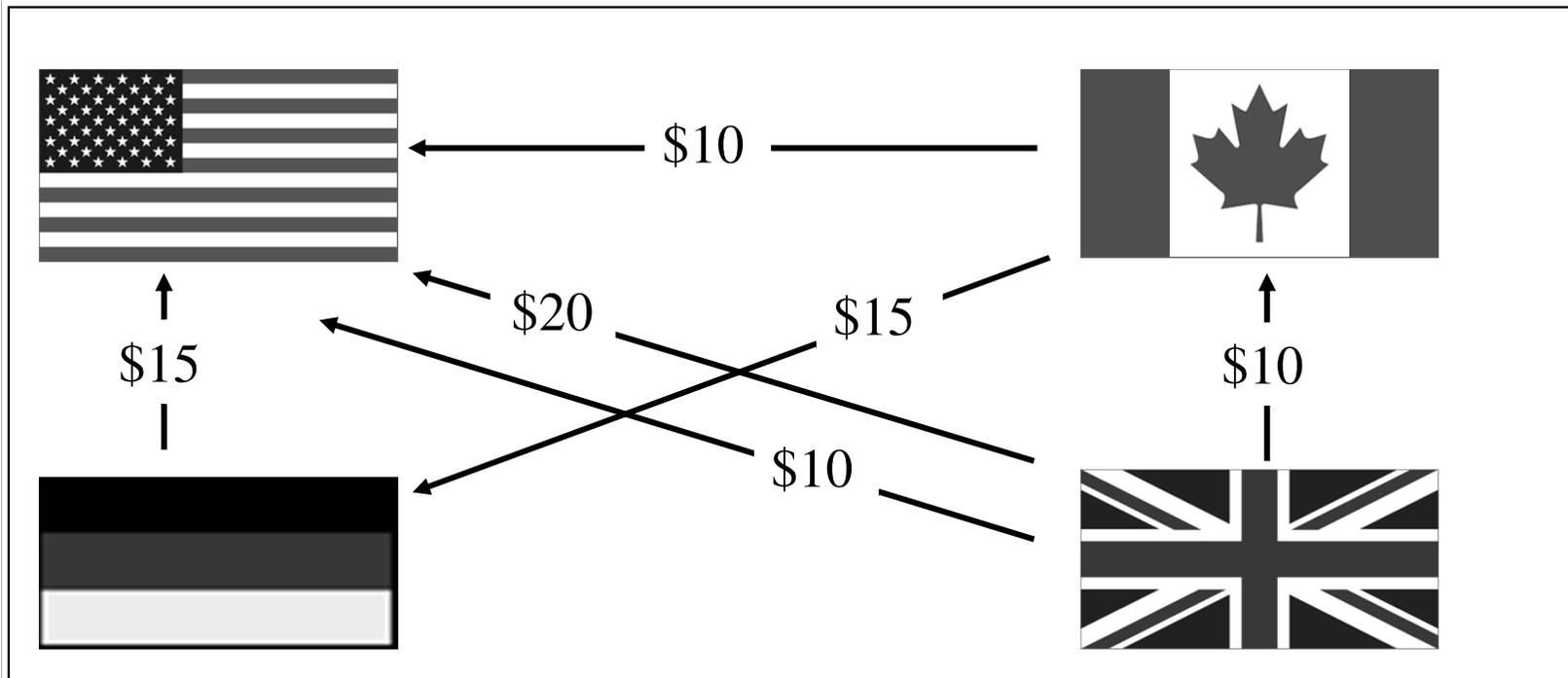
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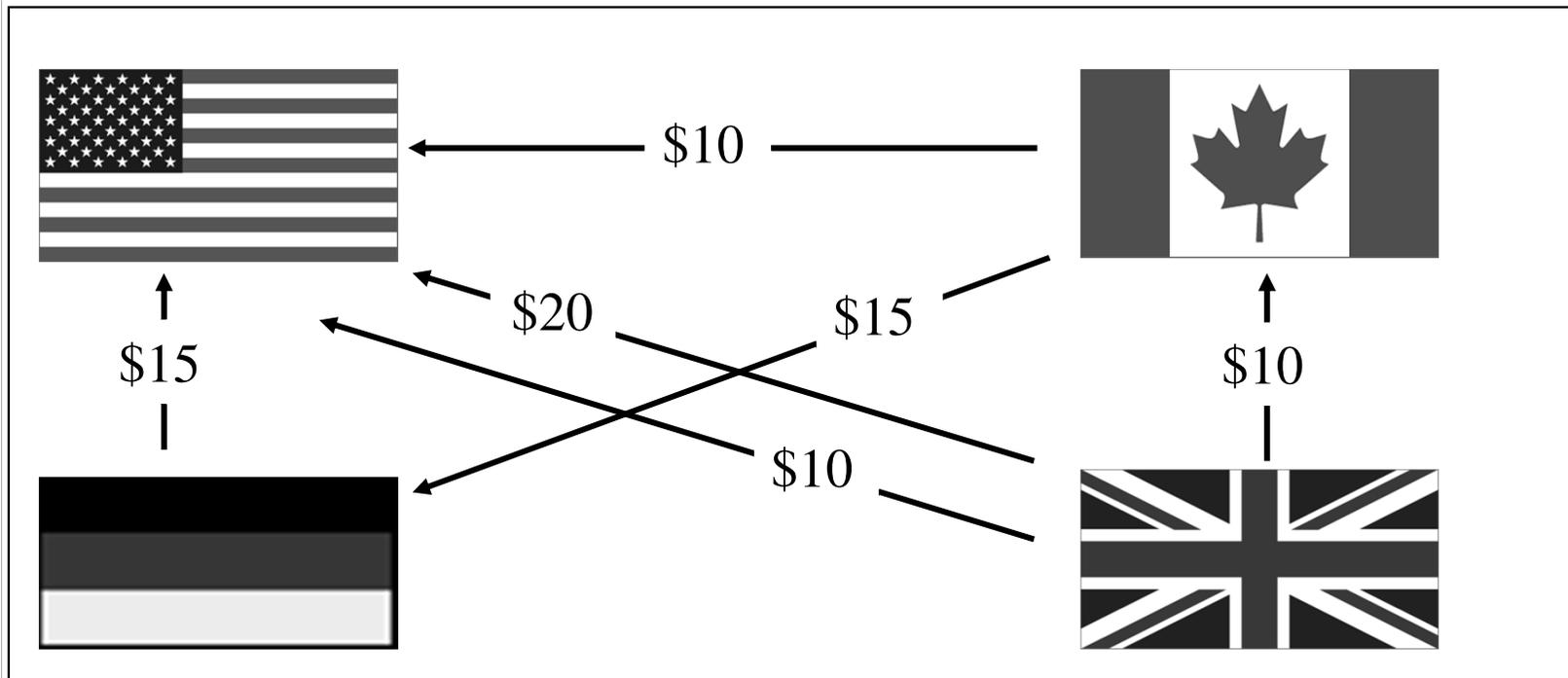
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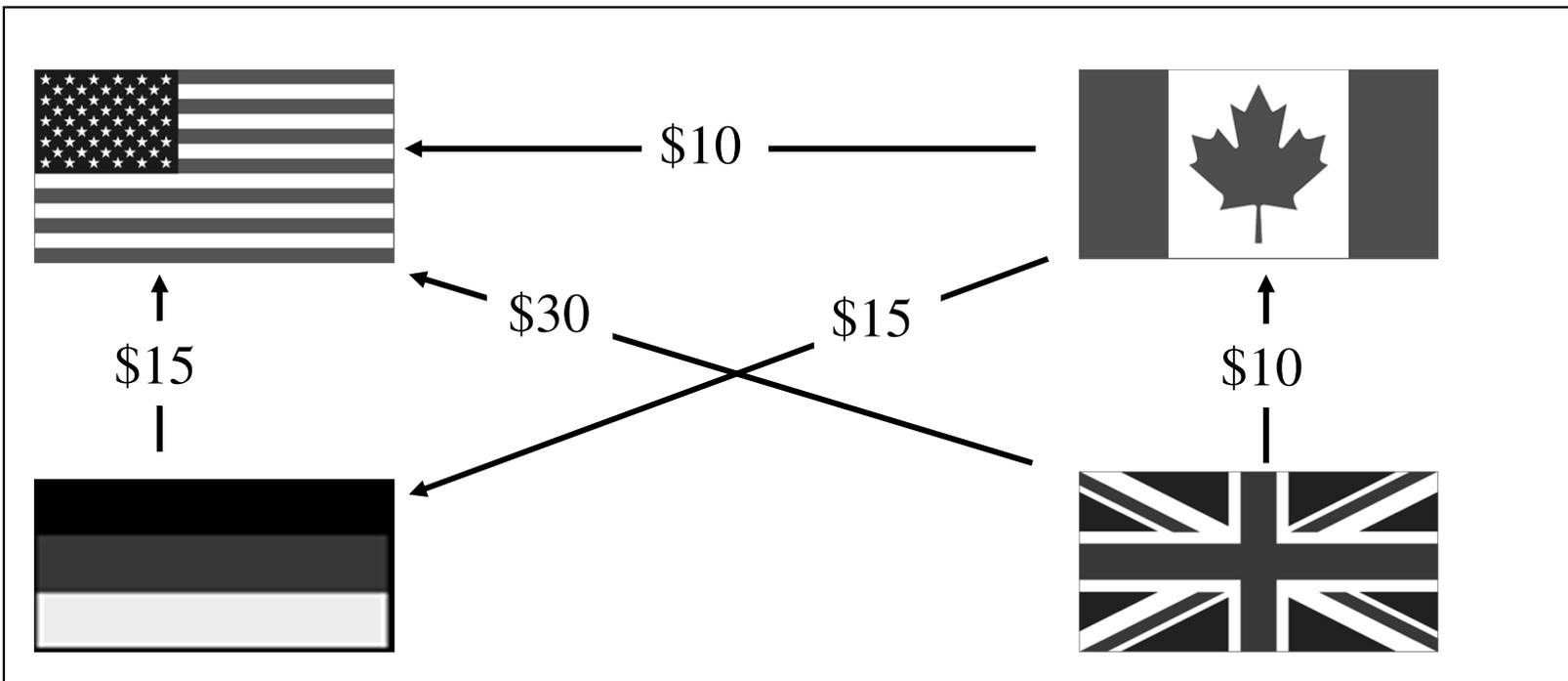
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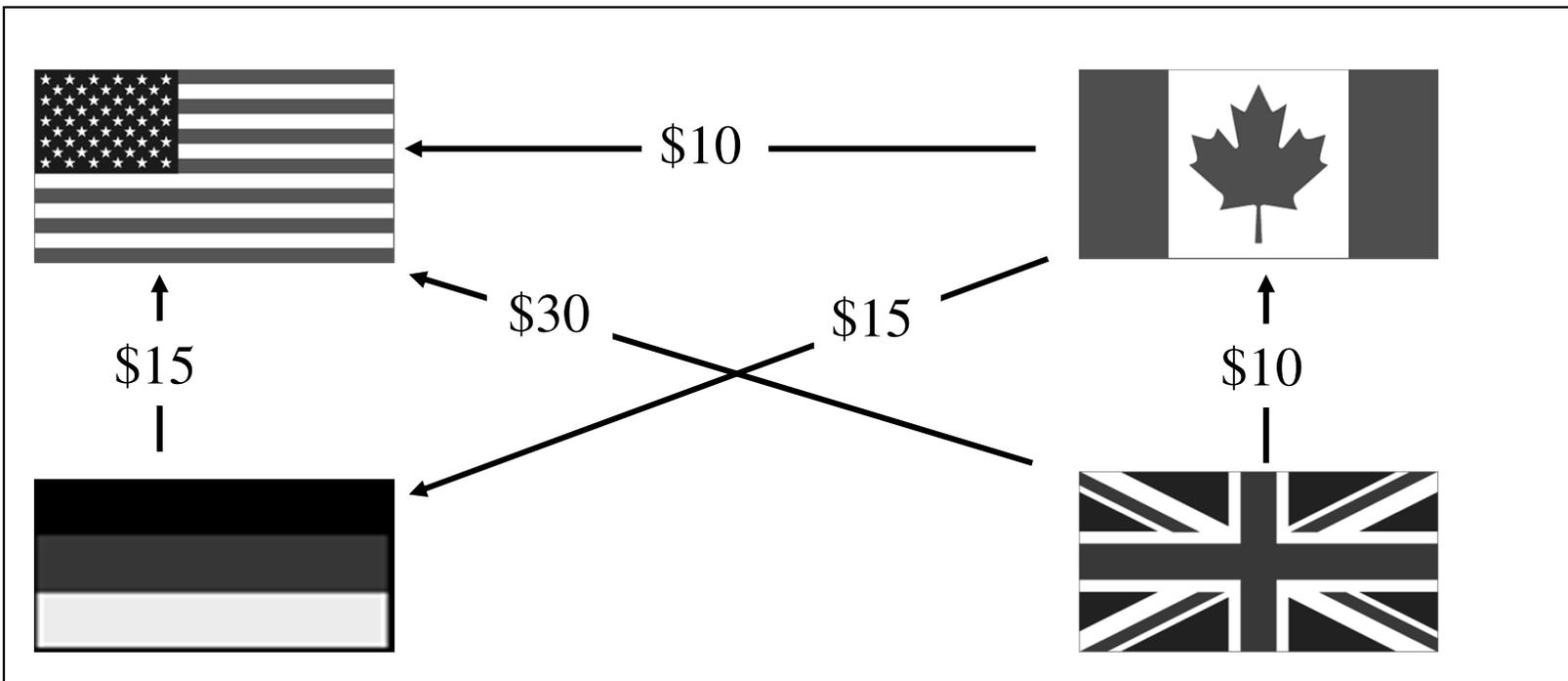
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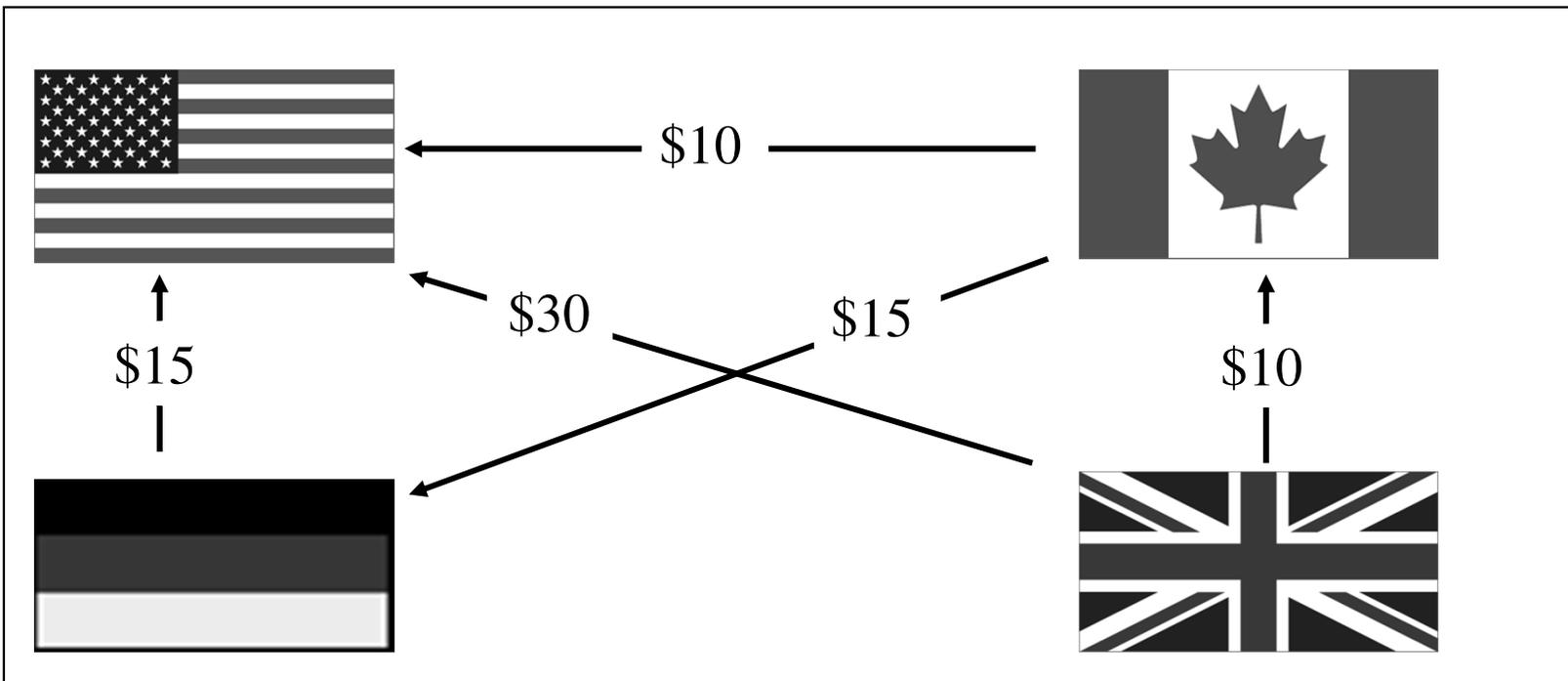
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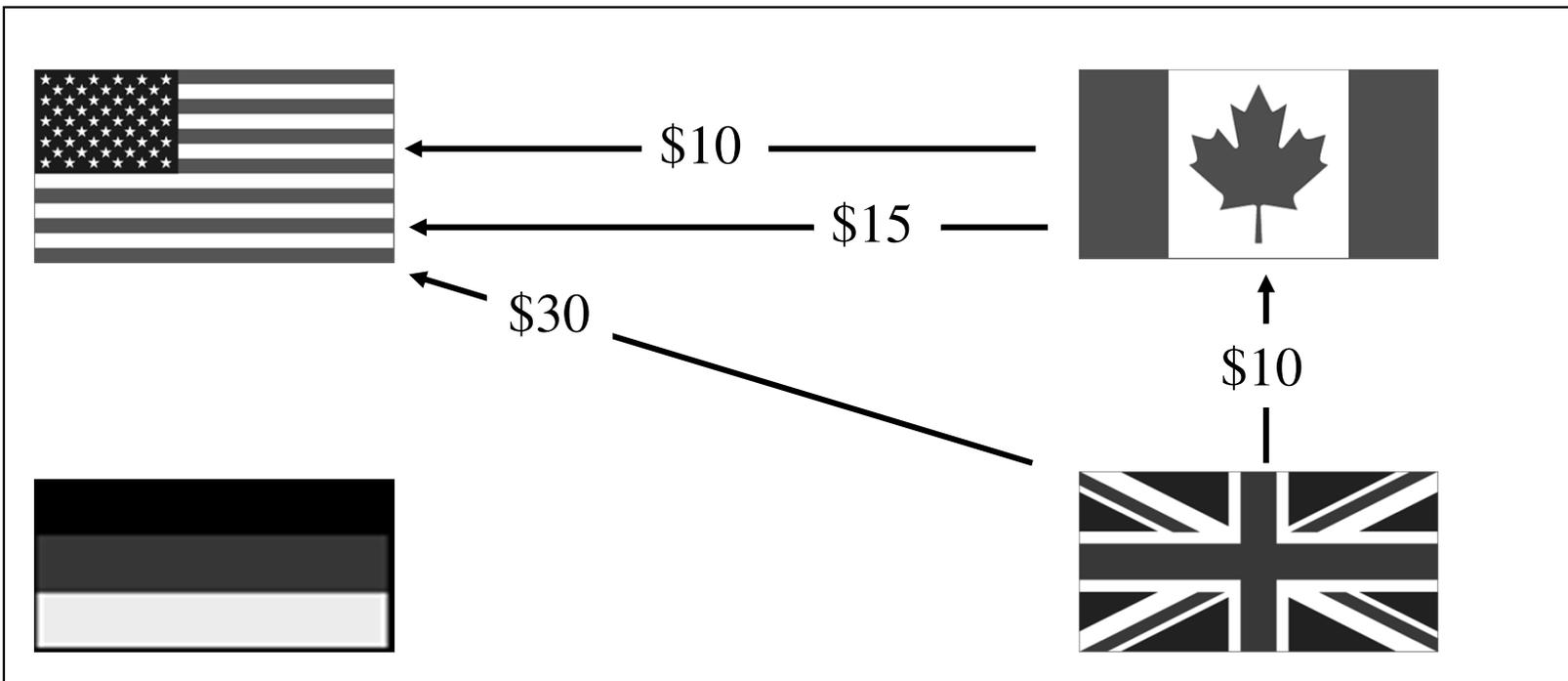
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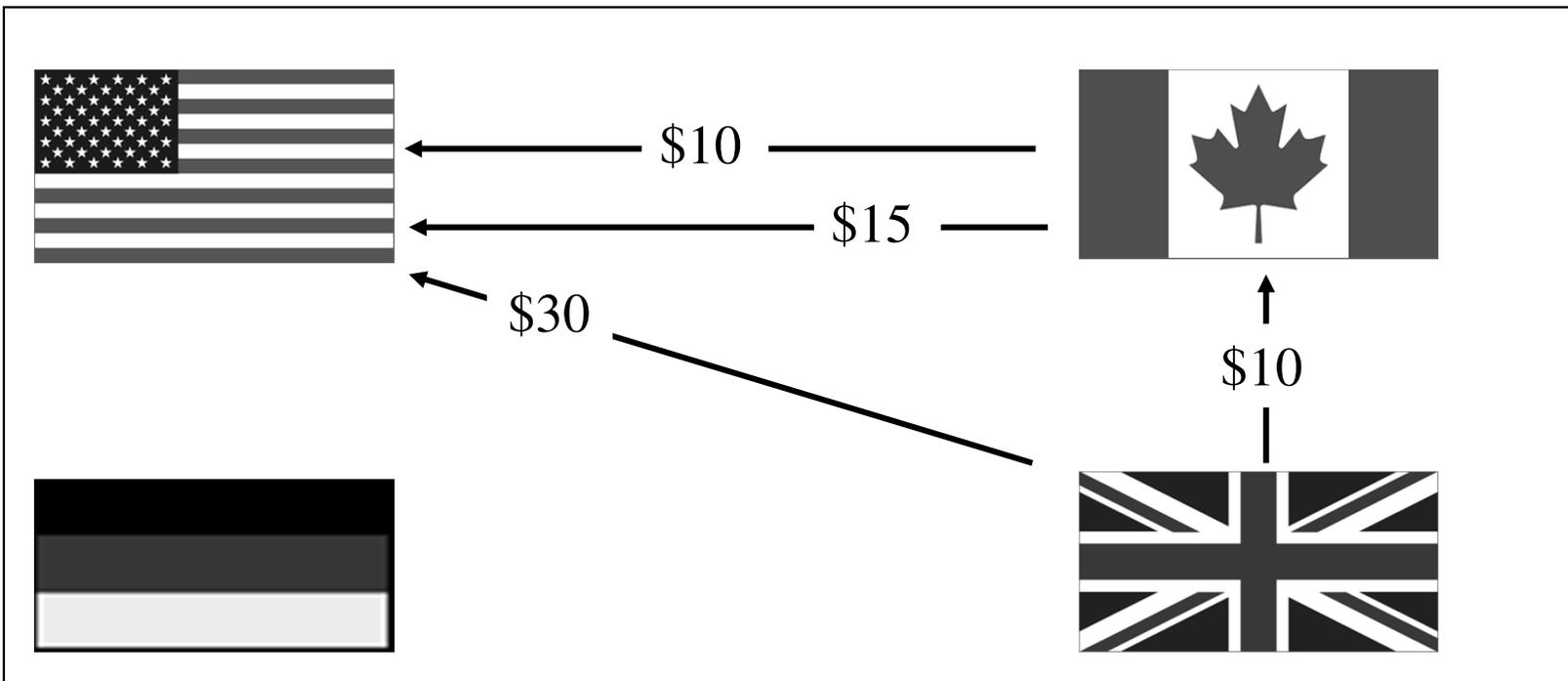
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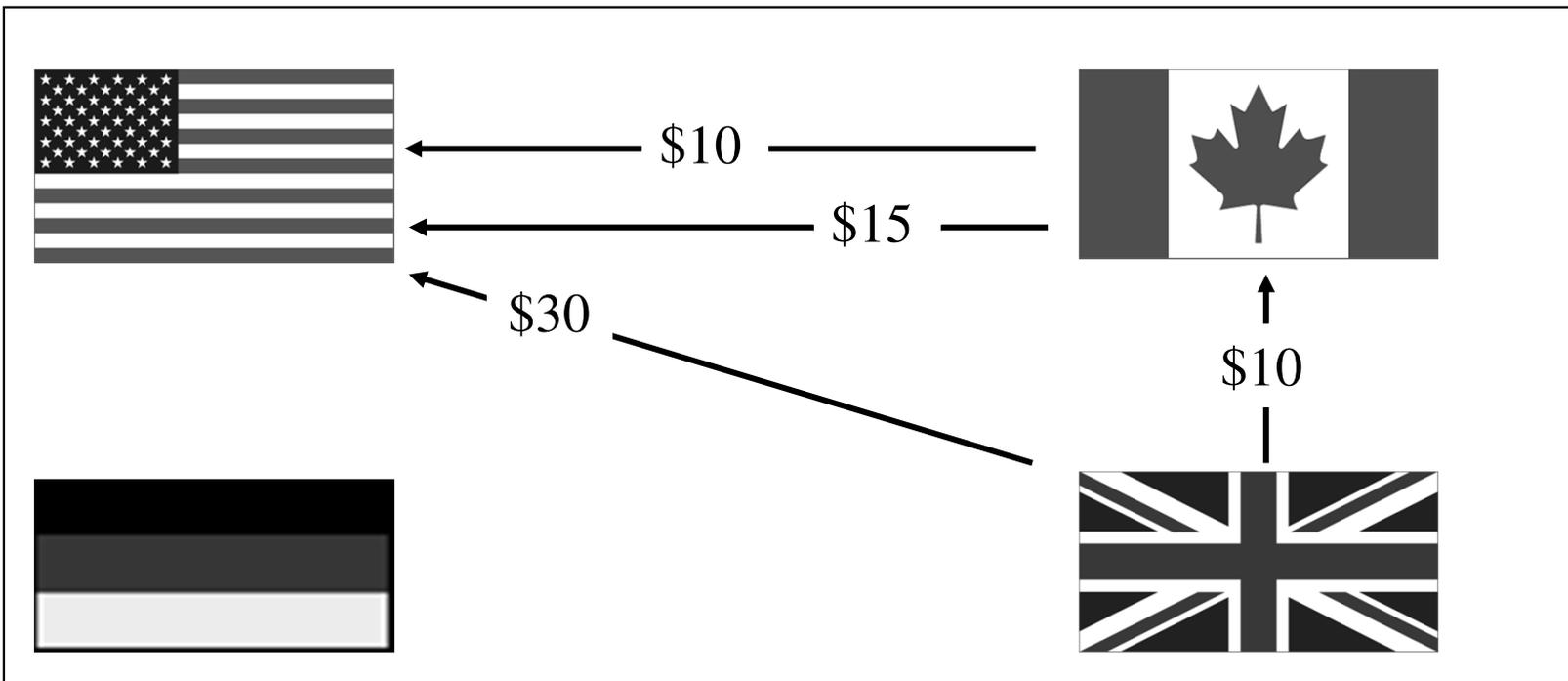
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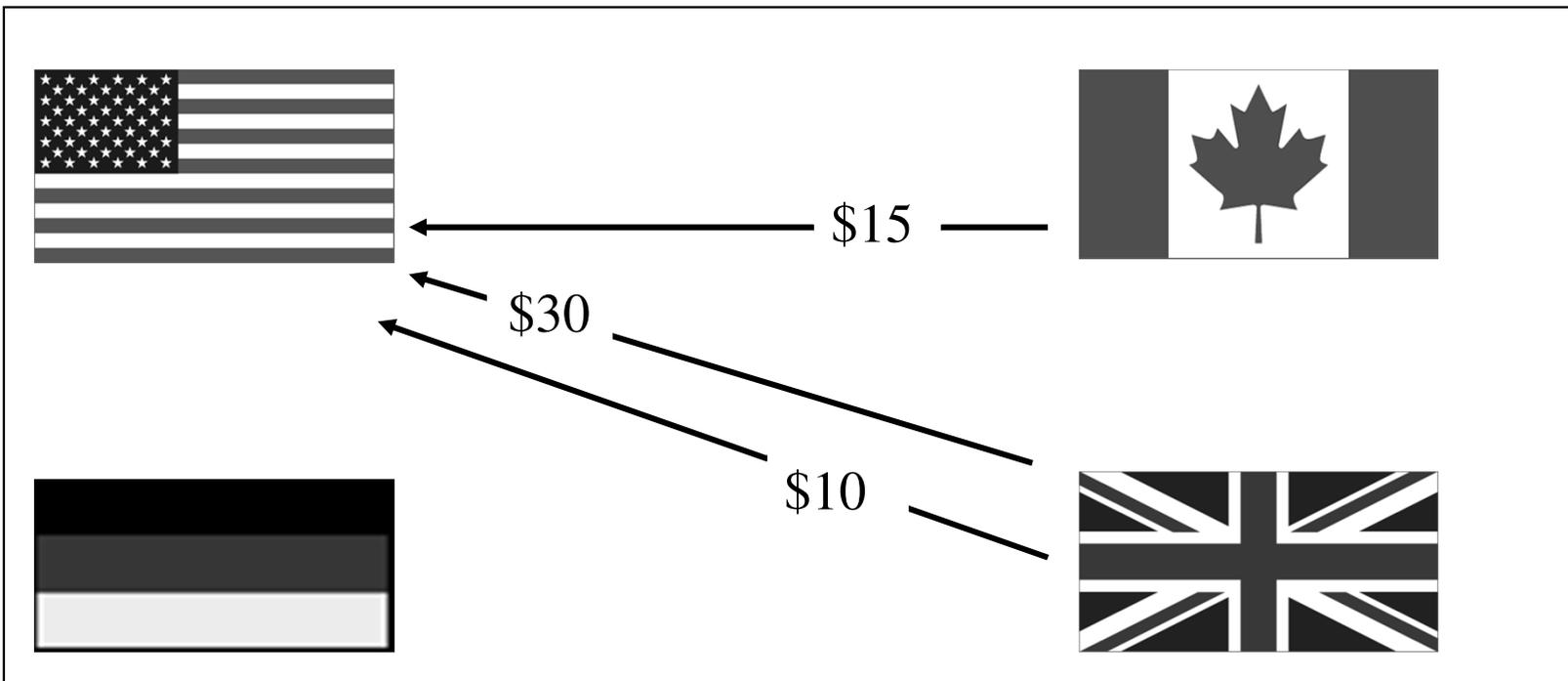
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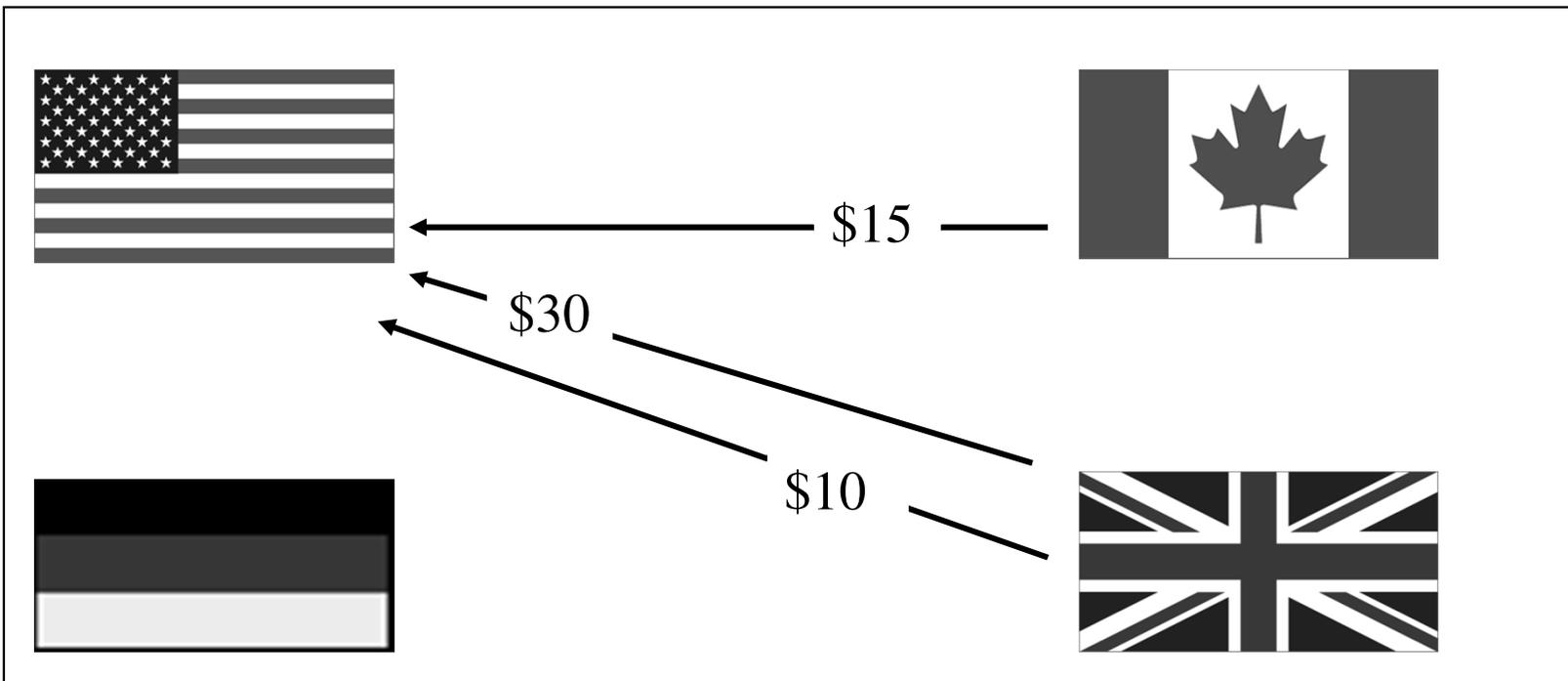
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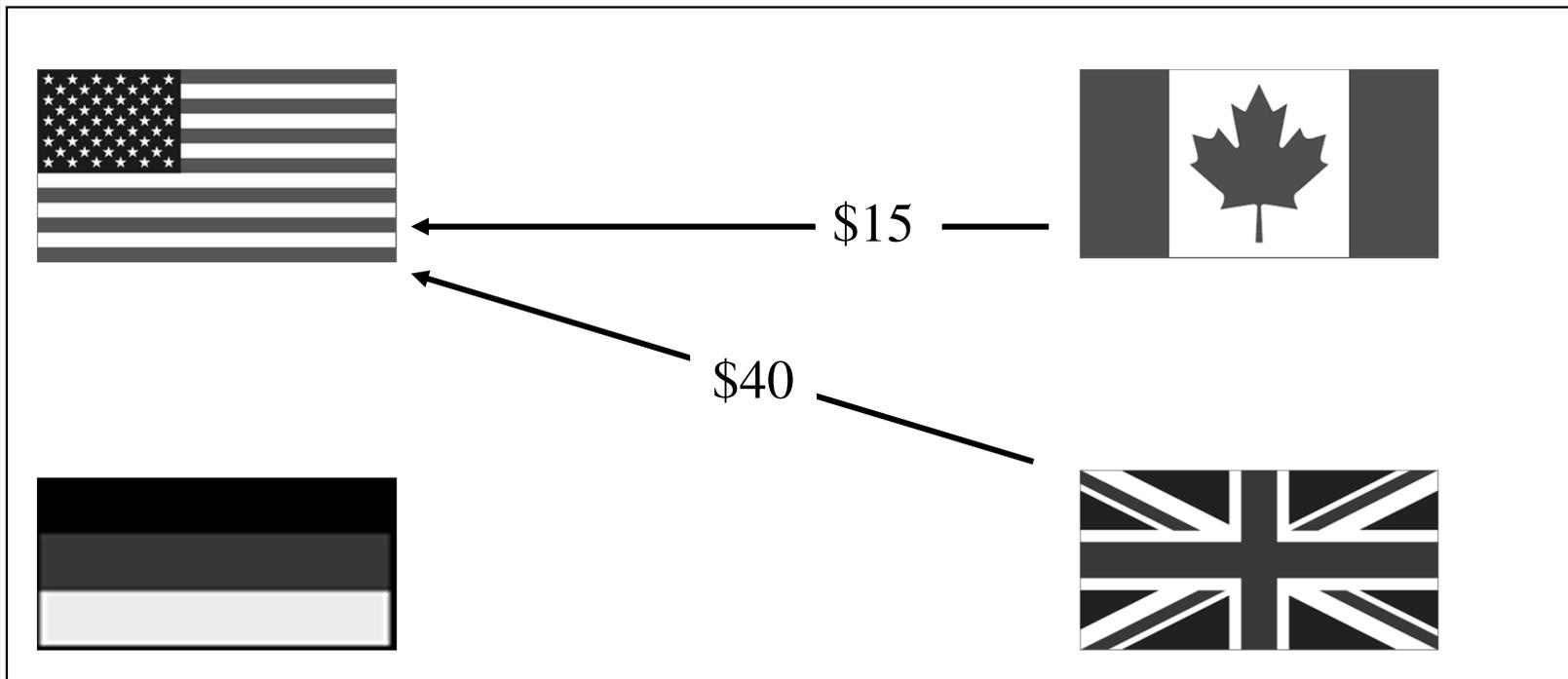
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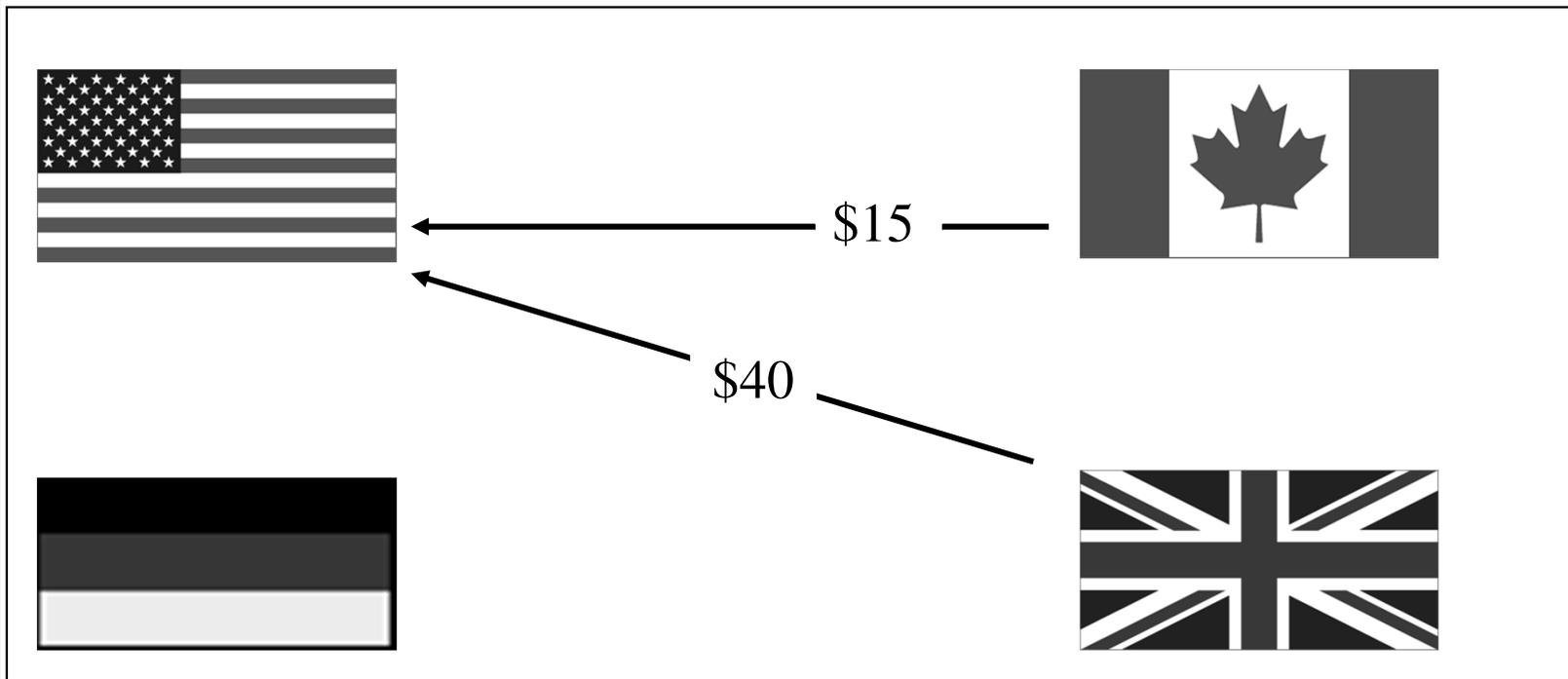
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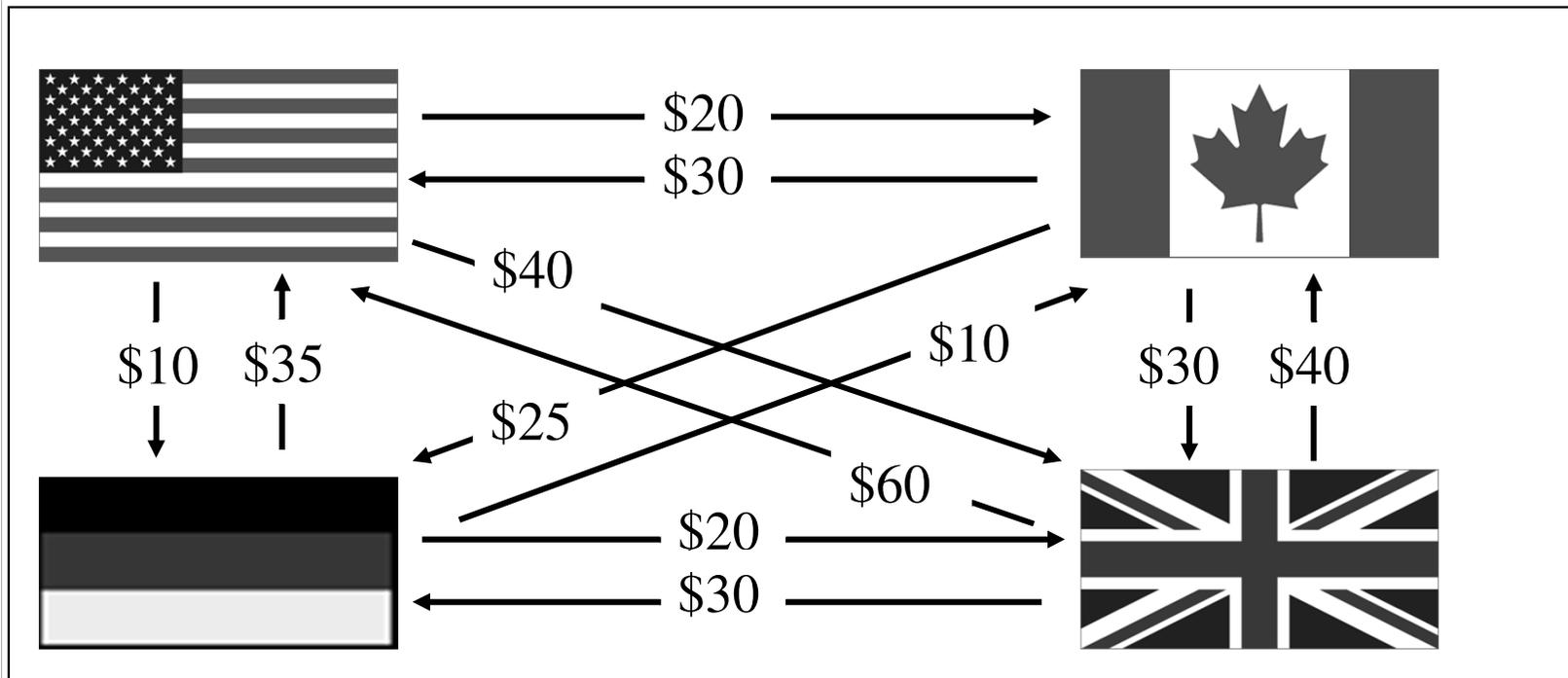
# Exposure Netting: an Example

Clearly, multilateral netting can simplify things greatly.



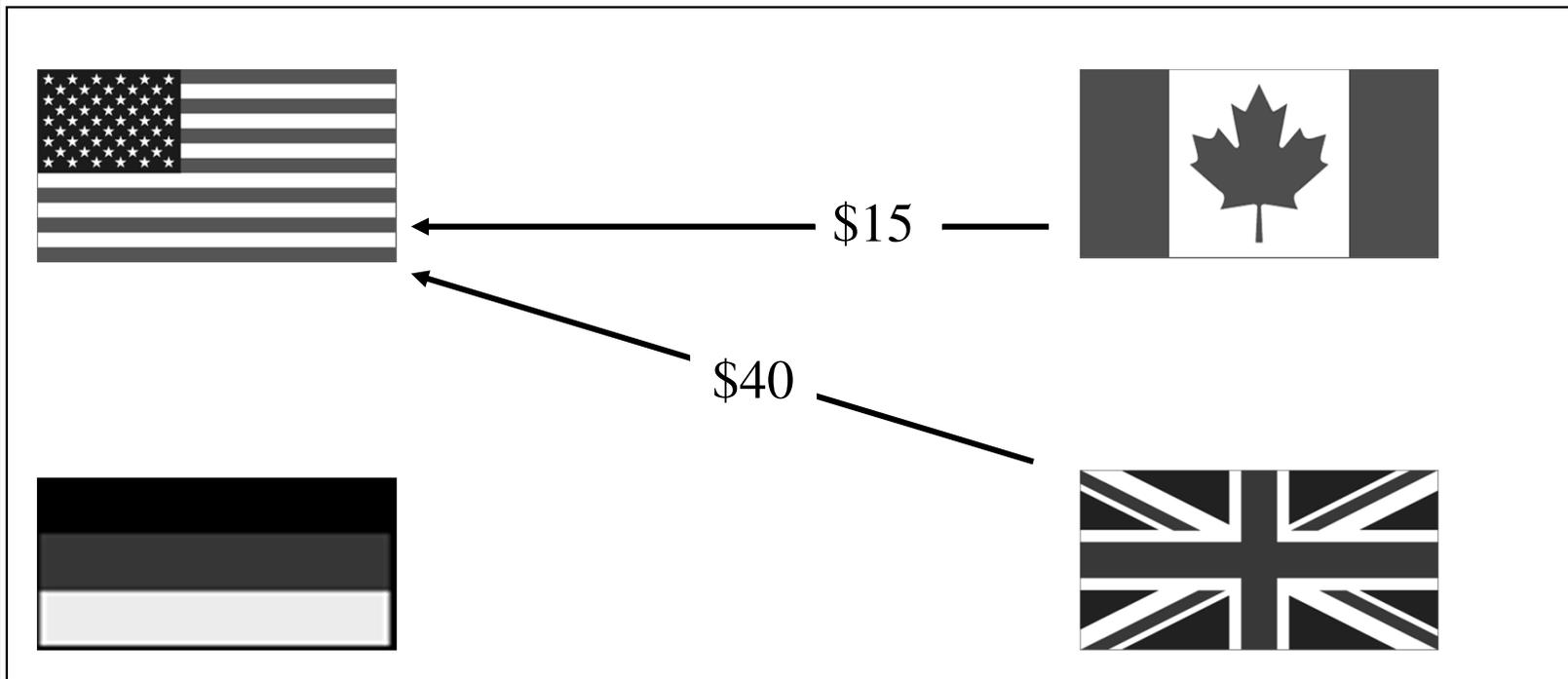
# Exposure Netting: an Example

Compare this:



# Exposure Netting: an Example

With this:



# Should the Firm Hedge?

- Not everyone agrees that a firm should hedge:
  - Hedging by the firm may not add to shareholder wealth if the shareholders can manage exposure themselves.
  - Hedging may not reduce the non-diversifiable risk of the firm. Therefore shareholders who hold a diversified portfolio are not helped when management hedges.

# Should the Firm Hedge?

- In the presence of *market imperfections*, the firm should hedge.
  - Information Asymmetry
    - ◆ The managers may have better information than the shareholders.
  - Differential Transactions Costs
    - ◆ The firm may be able to hedge at better prices than the shareholders.
  - Default Costs
    - ◆ Hedging may reduce the firm's cost of capital if it reduces the probability of default.

# Should the Firm Hedge?

- Taxes can be a large market imperfection.
  - Corporations that face progressive tax rates may find that they pay less in taxes if they can manage earnings by hedging than if they have “boom and bust” cycles in their earnings stream.

# What Risk Management Products do Firms Use?

- Most U.S. firms meet their exchange risk management needs with forward, swap, and options contracts.
- The greater the degree of international involvement, the greater the firm's use of foreign exchange risk management.

# End Chapter Thirteen