

Financial Derivatives

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UNION COLLEGE STUDENT INVESTMENT FUND

But First!

Buying

Selling

Selling Short

Buying to Cover

What is a Derivative?

A financial contract whose value is derived from some other asset called “the underlying”

Types of Derivatives

Futures

Forwards

Swaps

Options

Futures

Deliverable	• 1000 bushels of corn
Date	• March 22, 2024
Price	• \$5.50 per bushel

Futures

Deliverable

- The Value in US Dollars of 1000 Swiss Francs

Date

- January 1, 2024

Price

- \$1200

Details

What are the implications of futures being traded exclusively through exchanges?

Forwards

Similar to Futures Except for:

Over the Counter (OTC)

Unregulated and Privately Negotiated

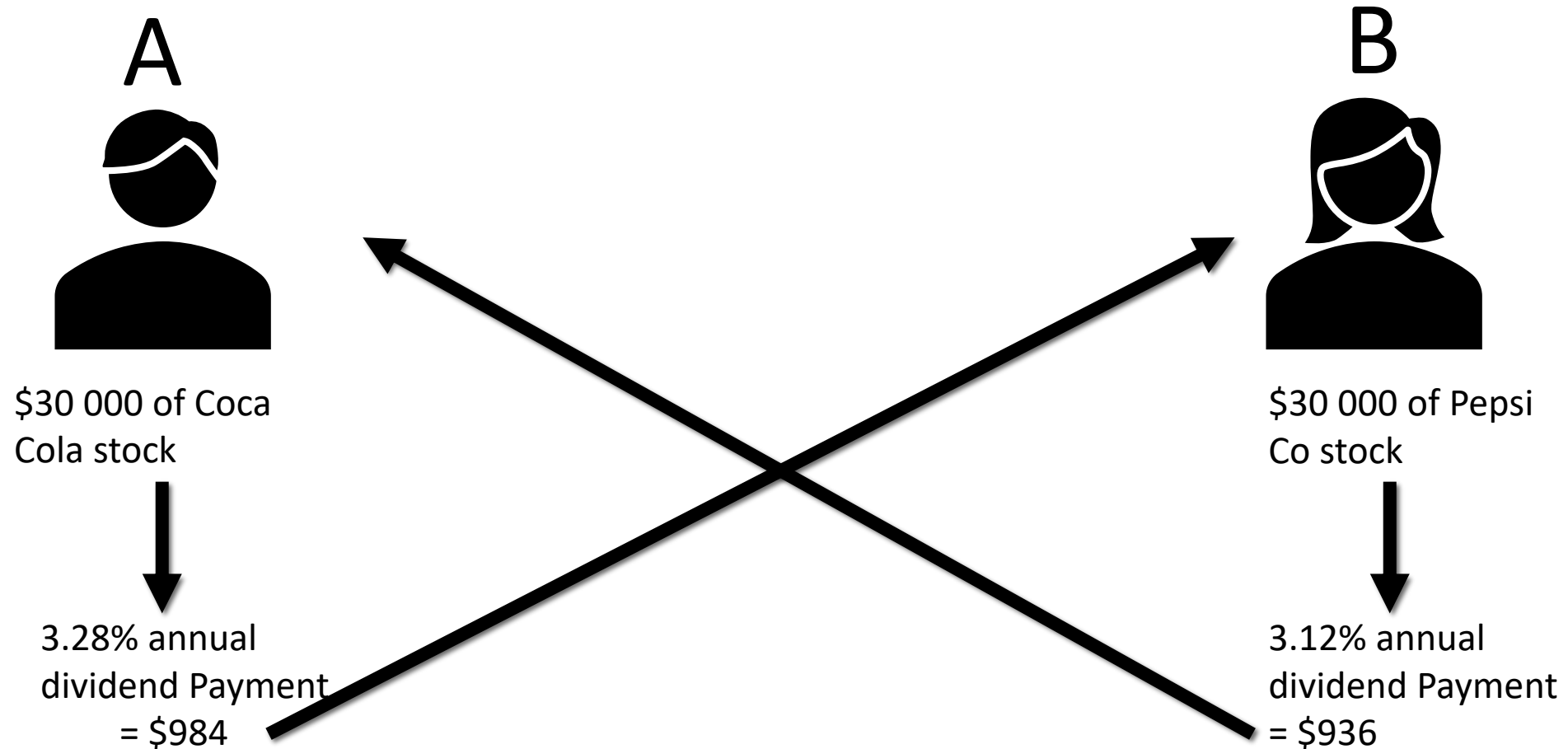
Subject to Counterparty Risk

Swaps

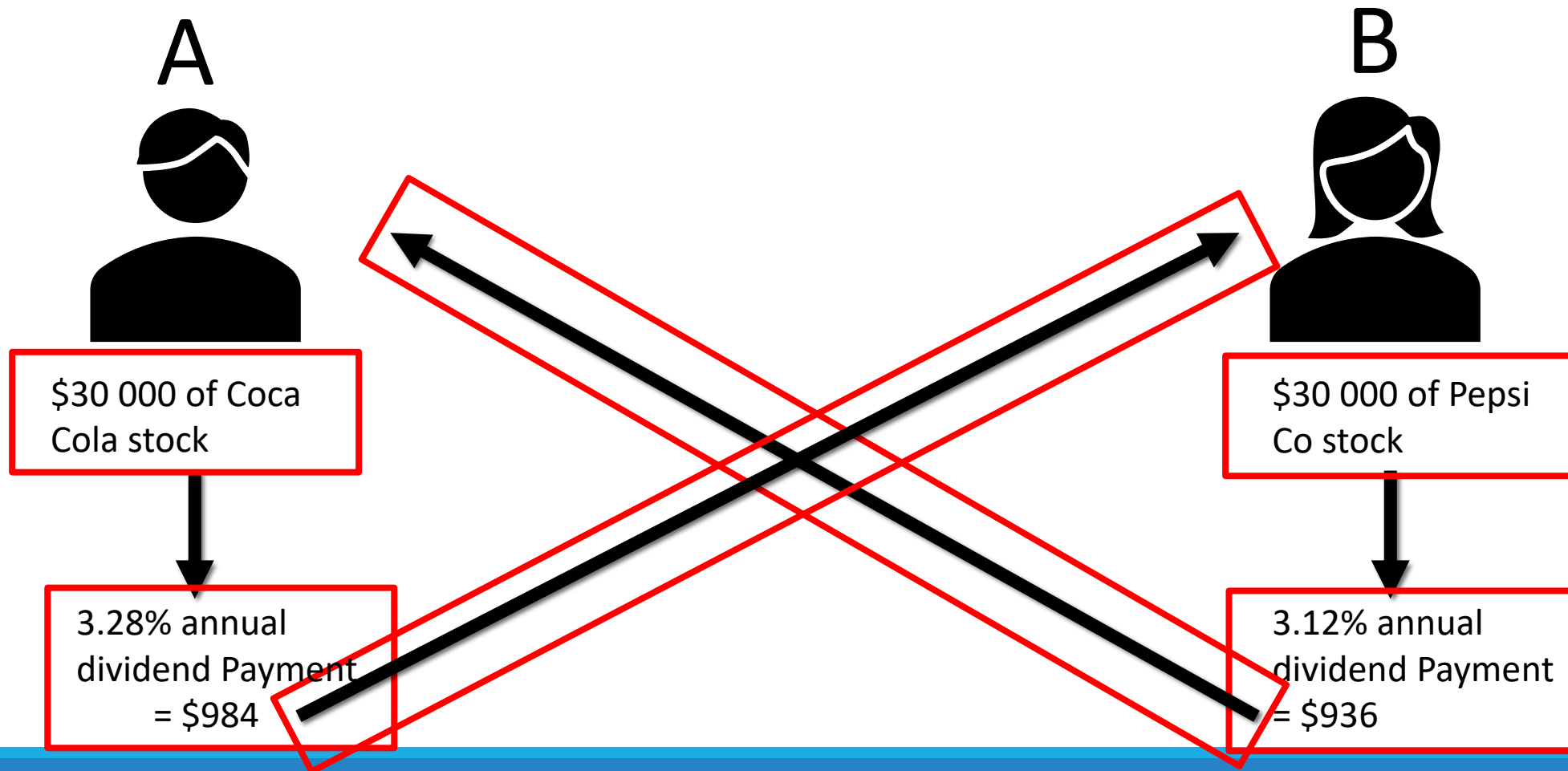
Typically OTC

Cashflow swap

Dividend Swap



Dividend Swap



Dividend Swap

Party A

Notional Principal amount

- \$30,000 Coca Cola Stock

Leg

- Coca Cola Dividend Payments

Party B

Notional Principal Amount

- \$30,000 Pepsi Co Stock

Leg

- Pepsi Co Dividend Payments

Interest Rate Swaps

Party A

Notional Principal Amount

- \$1,000,000

Leg

- A bank's floating interest rate payment on a loan for the principal amount

Party B

Notional Principal Amount

- \$1,000,000

Leg

- 4% Annual percent interest rate

Life Insurance (Not a swap but good as an example)

Party A

Policy Holder

- Potential payout of \$1,000,000

Leg

- 0.05% per year
 - \$500 yearly

Party B

Insurance Company

- Potential payout of \$1,000,000

Leg

- In the event of Party A's death, \$1,000,000

Credit Default Swap

Party A

Policy Holder

- Potential payout of \$1,000,000

Leg

- 0.05% per year
 - \$500 yearly

Party B

Insurance Company

- \$1,000,000

Leg

- In the event of Party A's death, \$1,000,000

Credit Default Swap

Party A

Notional Principal Amount

- Credit of \$10,000,000

Leg

- 0.05% per year
 - \$500 yearly

Party B

Notional Principal Amount

- Credit of \$10,000,000

Leg

- In the event of Party A's death, \$1,000,000

Credit Default Swap

Party A

Notional Principal Amount

- Credit of \$10,000,000

Leg

- 1% per year
 - \$25,000 quarterly

Party B

Notional Principal Amount

- Credit of \$10,000,000

Leg

- In the event of Party A's death, \$1,000,000

Credit Default Swap

Party A

Notional Principal Amount

- Credit of \$10,000,000

Leg

- 1% per year
 - \$25,000 quarterly

Party B

Notional Principal Amount

- Credit of \$10,000,000

Leg

- In the event of Party A's debtor defaulting on their debt, Party B pays the debt, \$10,000,000

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here due to time constraint

Options

Deliverable

Type (Call or Put)

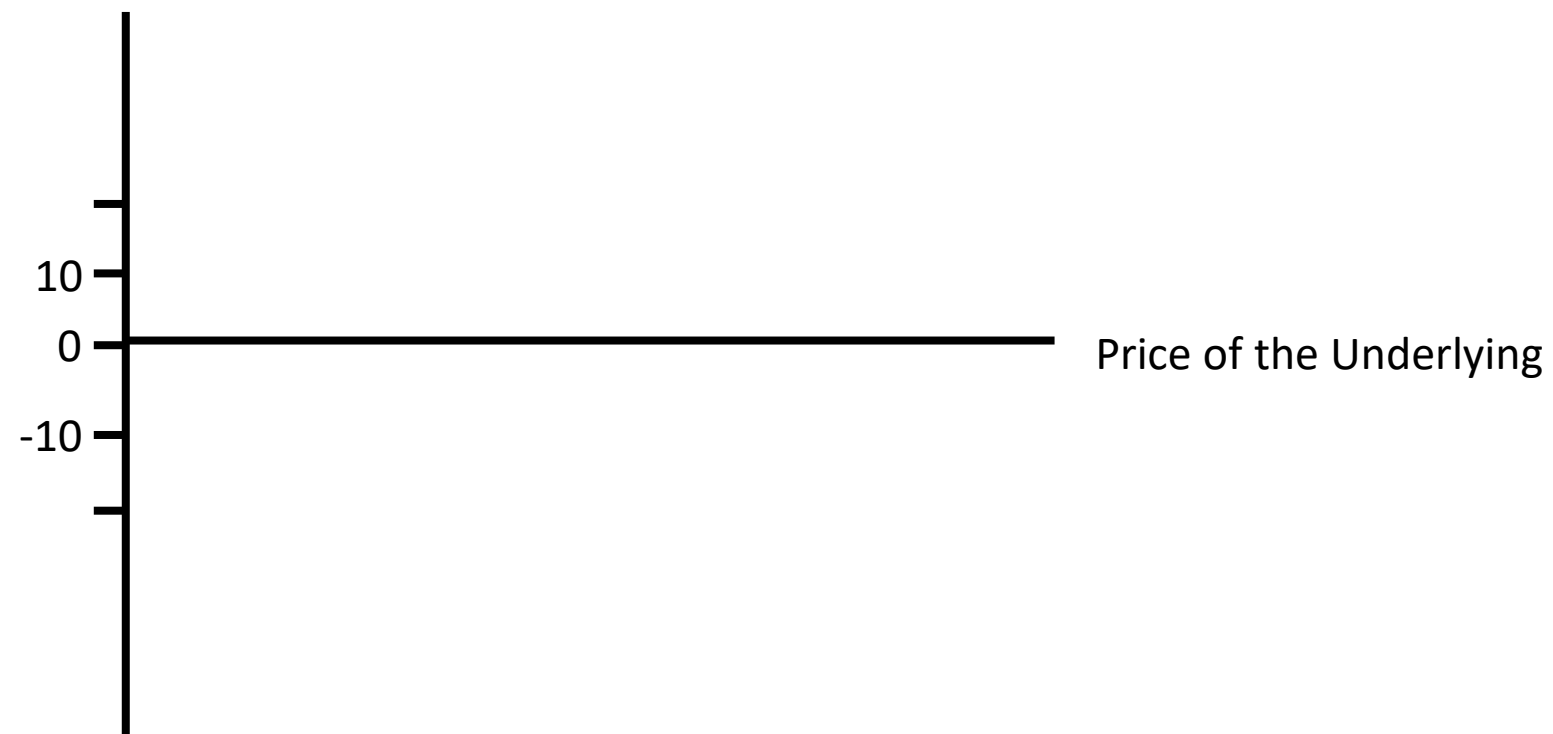
Strike Price

Expiration Date

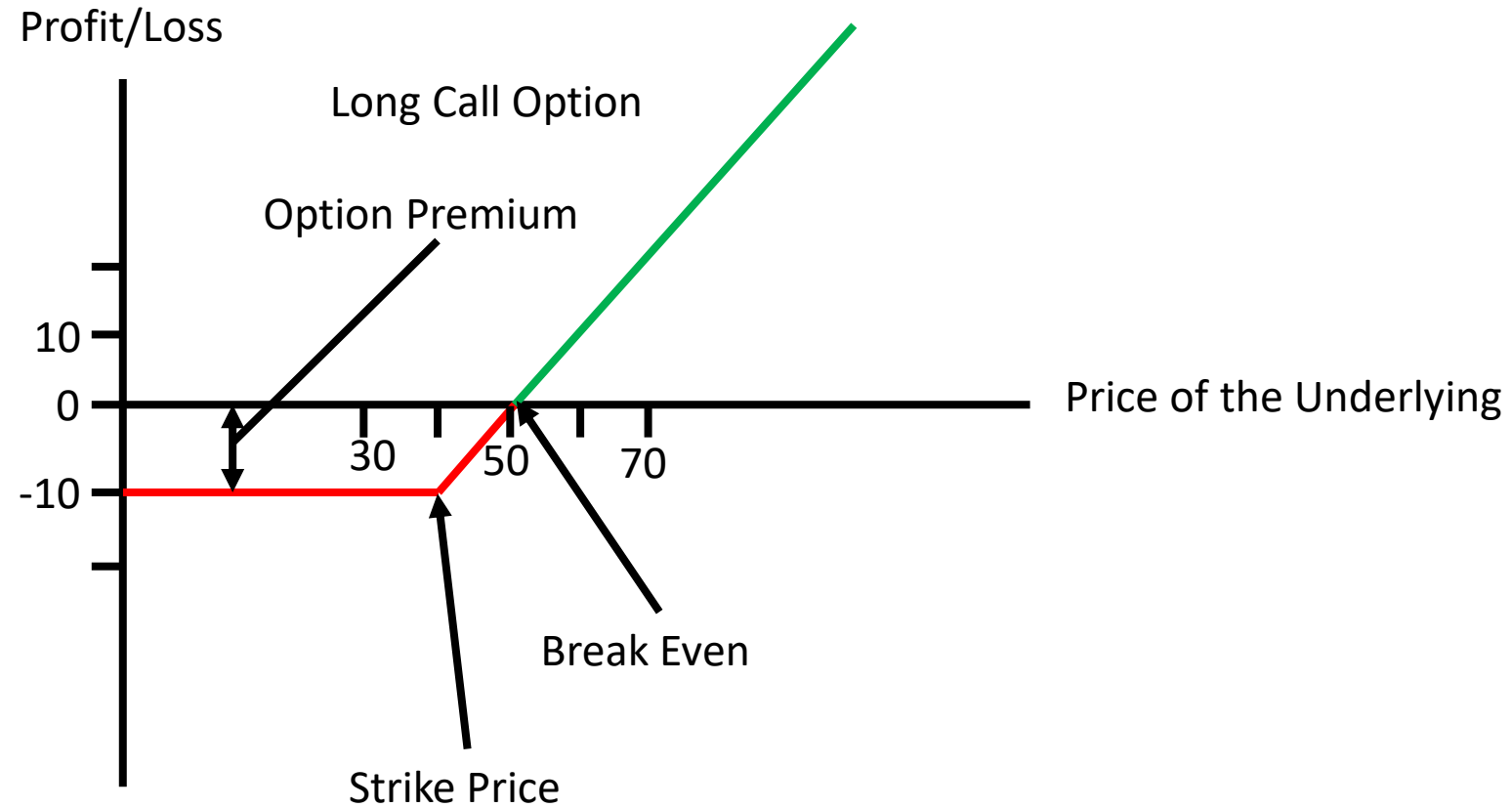
Option Premium

Options

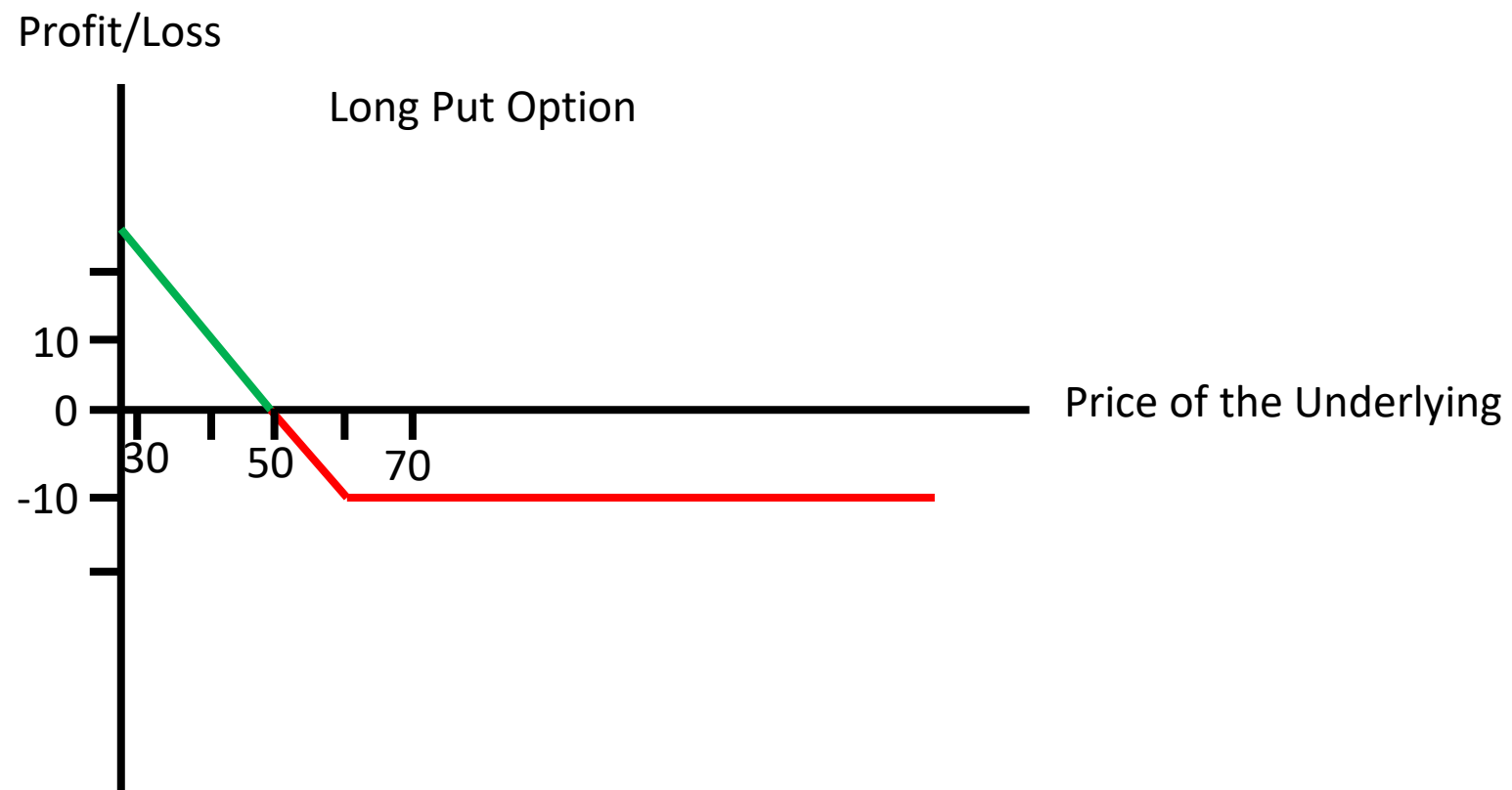
Profit/Loss



Call Options



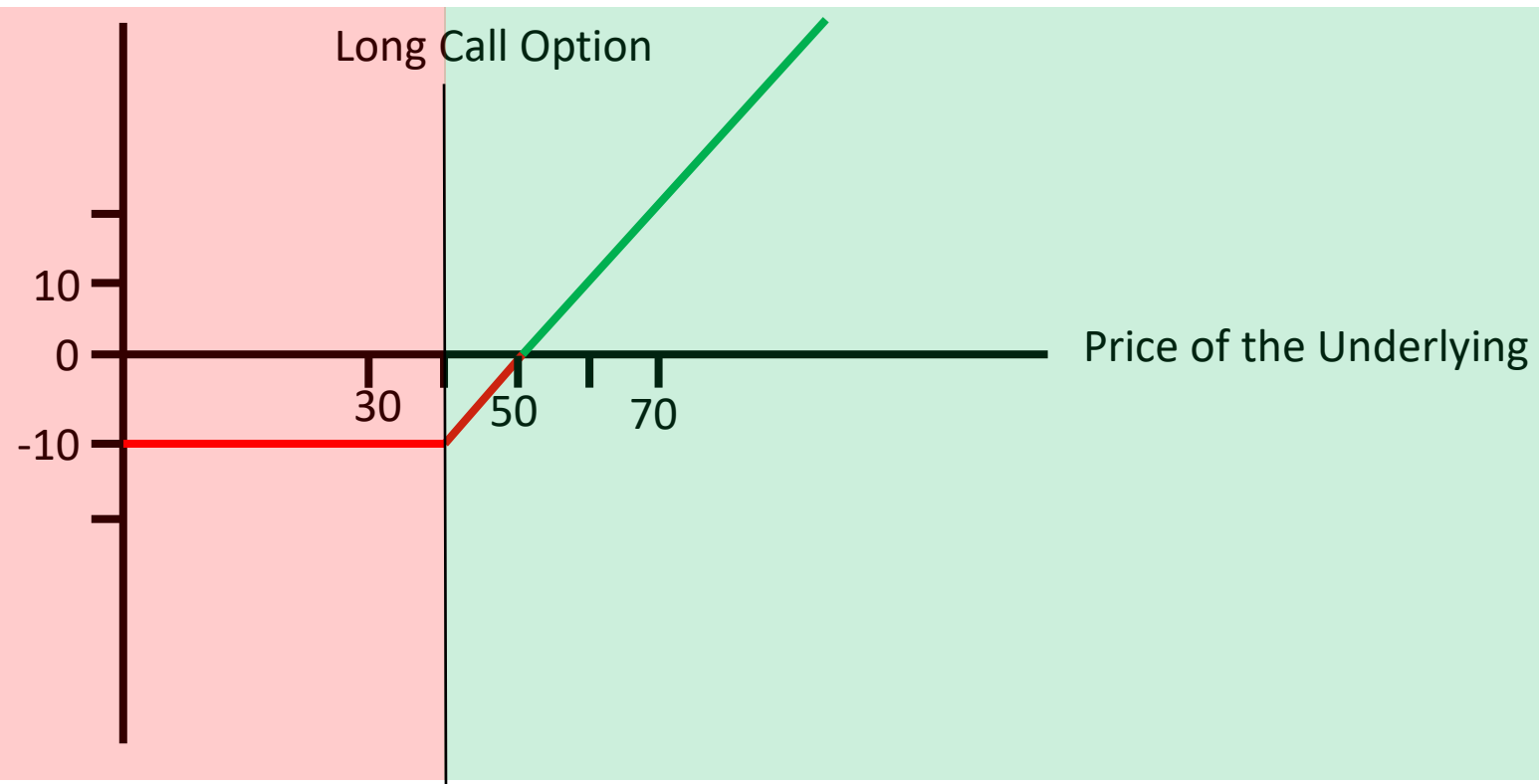
Put Options



In the Money vs Out of the Money (ITM/OTM)

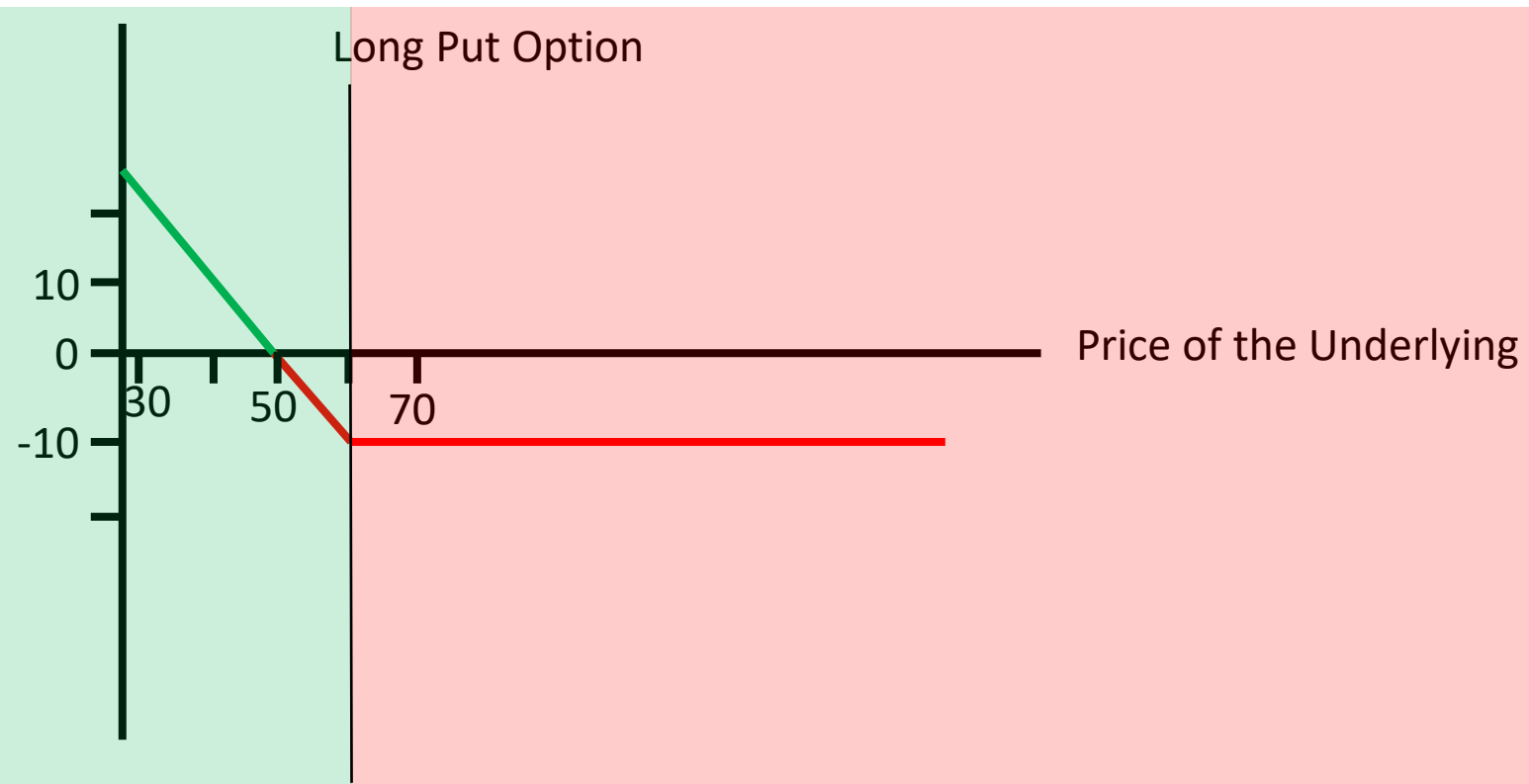
Call Options ITM/OTM

Profit/Loss



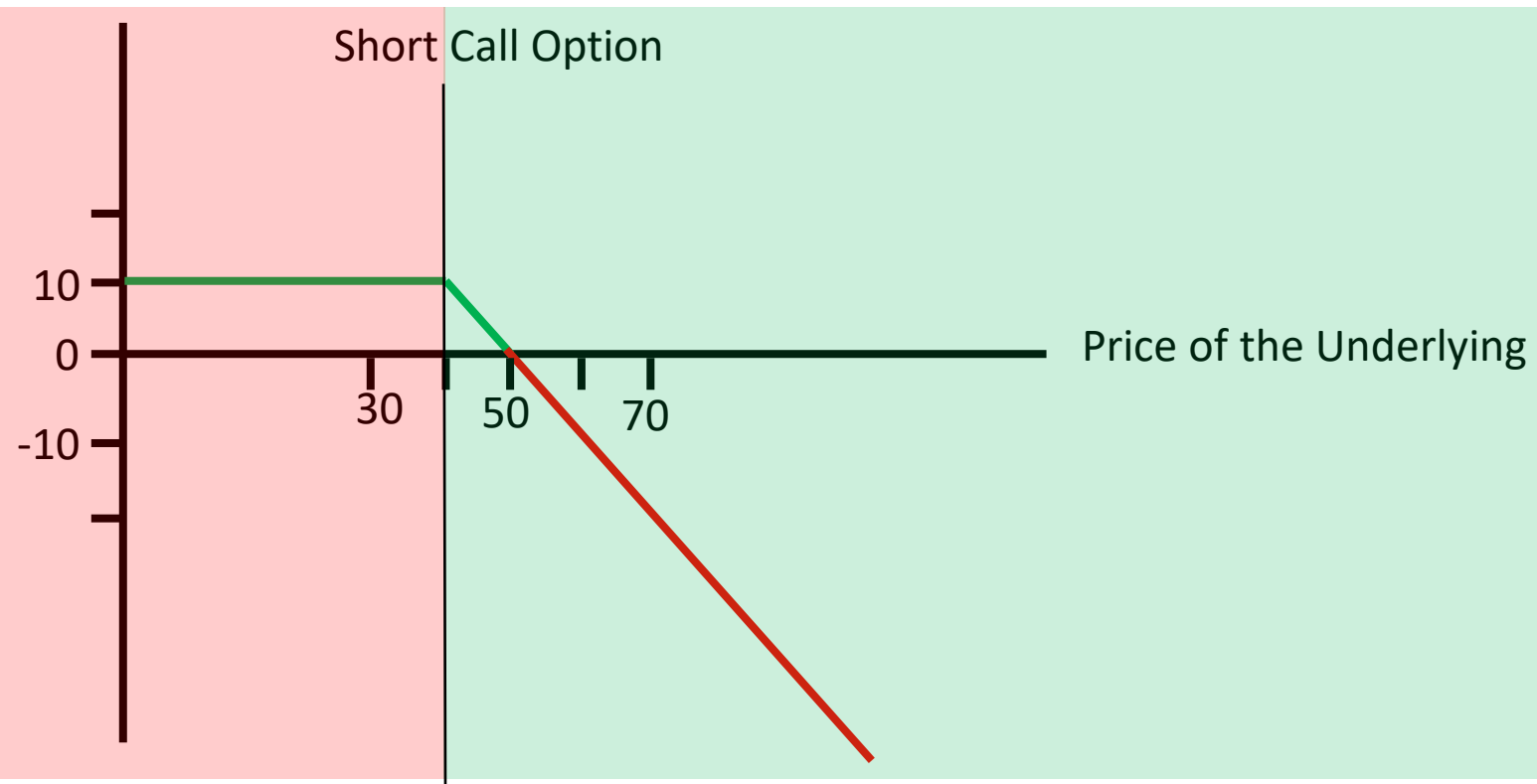
Put Options

Profit/Loss

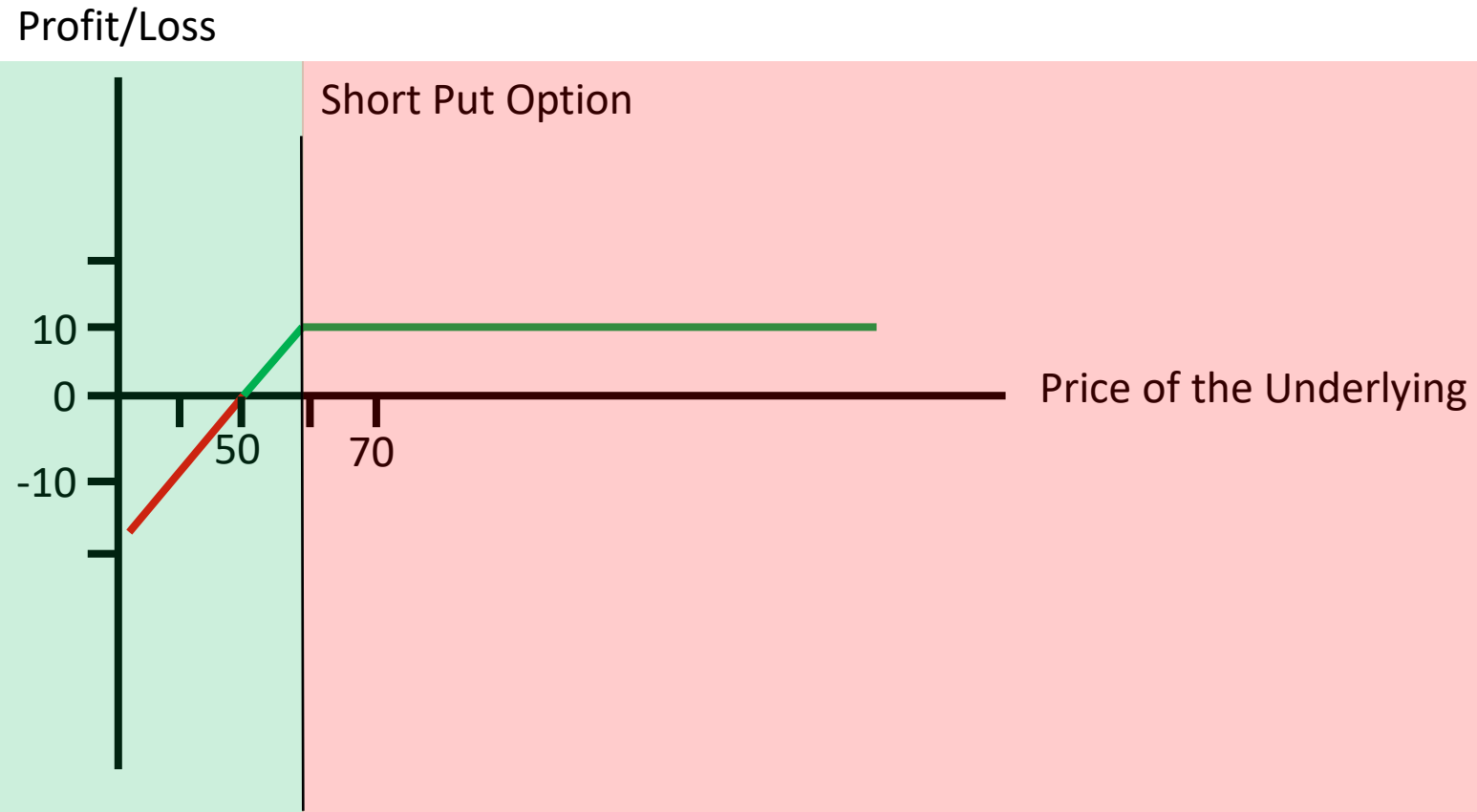


Selling Call Options

Profit/Loss



Selling Put Options



Naked (Uncovered) Options

Selling Options Without Owning the Underlying

Leverage



Options Strategies

- Covered Call
- Married Put
- Collar
- Strangle
- Straddle
- A Ton of Others

Covered Call

Selling Calls + Owning the Underlying

Covered Call

Selling Calls + Owning the Underlying

Profit/Loss of the Underlying at Expiration:

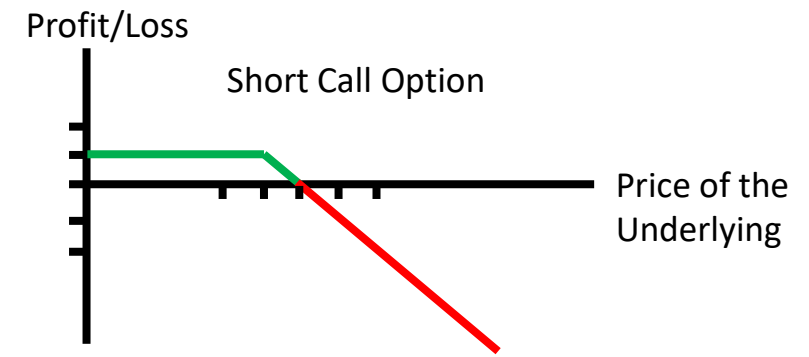
$$f(\text{expirationPrice}) = \text{expirationPrice} - \text{costBasis}$$

Covered Call

Selling Calls + Owning the Underlying

Profit/Loss of Selling Call Option at Expiration:

$$f(\text{expirationPrice}) = \begin{cases} \text{optionPremium} & \text{if } \text{expirationPrice} < \text{strikePrice} \\ -\text{expirationPrice} + \text{optionPremium} + \text{strikePrice} & \text{if } \text{expirationPrice} > \text{strikePrice} \end{cases}$$



Covered Call

Selling Calls +

Owning the Underlying

$$f(\text{expirationPrice}) = \begin{cases} \text{optionPremium} + \text{expirationPrice} - \text{costBasis} & \text{if } \text{expirationPrice} < \text{strikePrice} \\ \text{optionPremium} + \text{strikePrice} - \text{costBasis} & \text{if } \text{expirationPrice} > \text{strikePrice} \end{cases}$$

optionPremium = \$10

costBasis = \$45

strikePrice = \$50

Covered Call

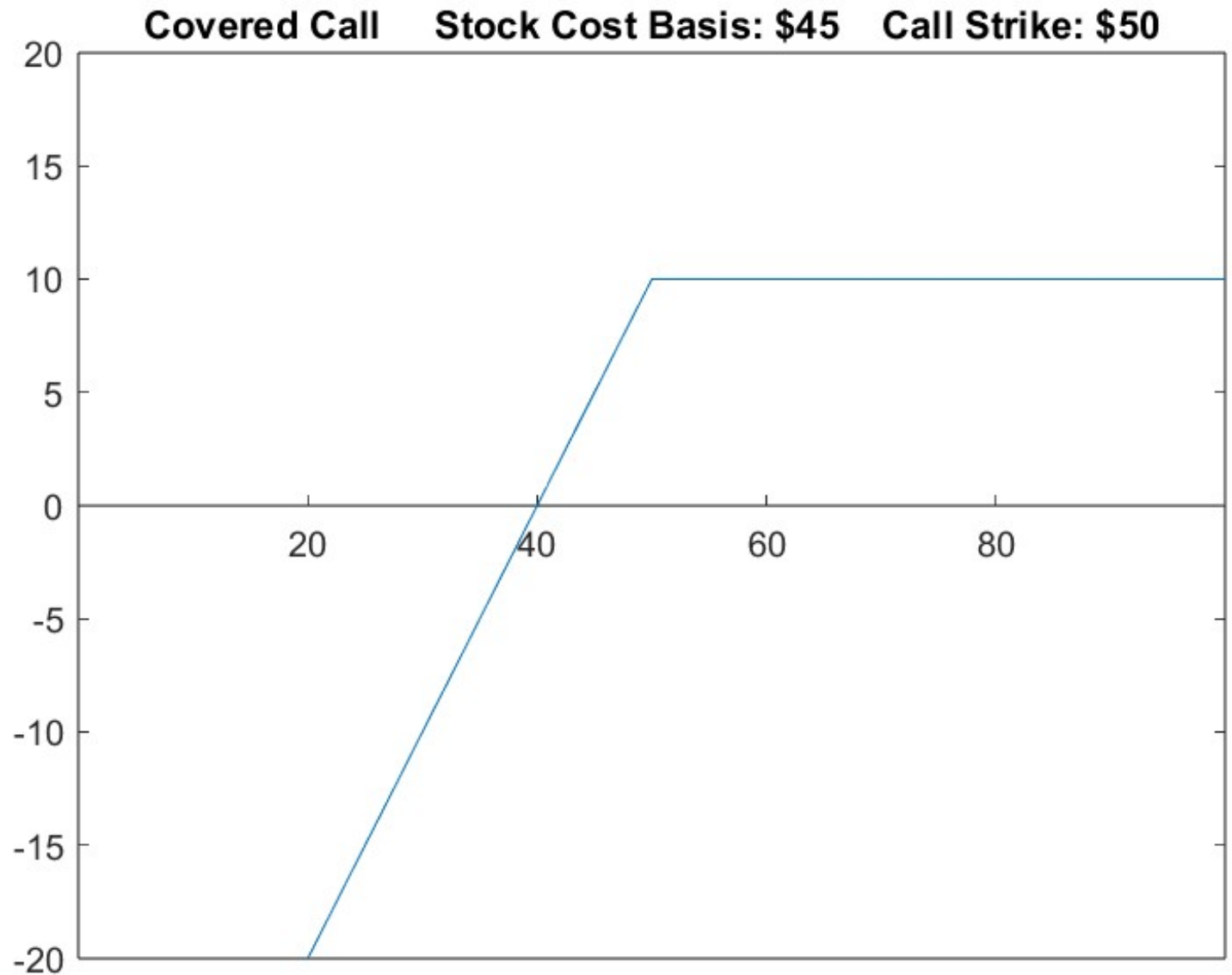
Selling Calls +
Owning the Underlying

optionPremium = \$10

costBasis = \$45

strikePrice = \$50

$$f(\text{expirationPrice}) = \begin{cases} \text{optionPremium} + \text{expirationPrice} - \text{costBasis} & \text{if } \text{expirationPrice} < \text{strikePrice} \\ \text{optionPremium} + \text{strikePrice} - \text{costBasis} & \text{if } \text{expirationPrice} > \text{strikePrice} \end{cases}$$



Option Collar

Owning the Underlying

Selling Calls

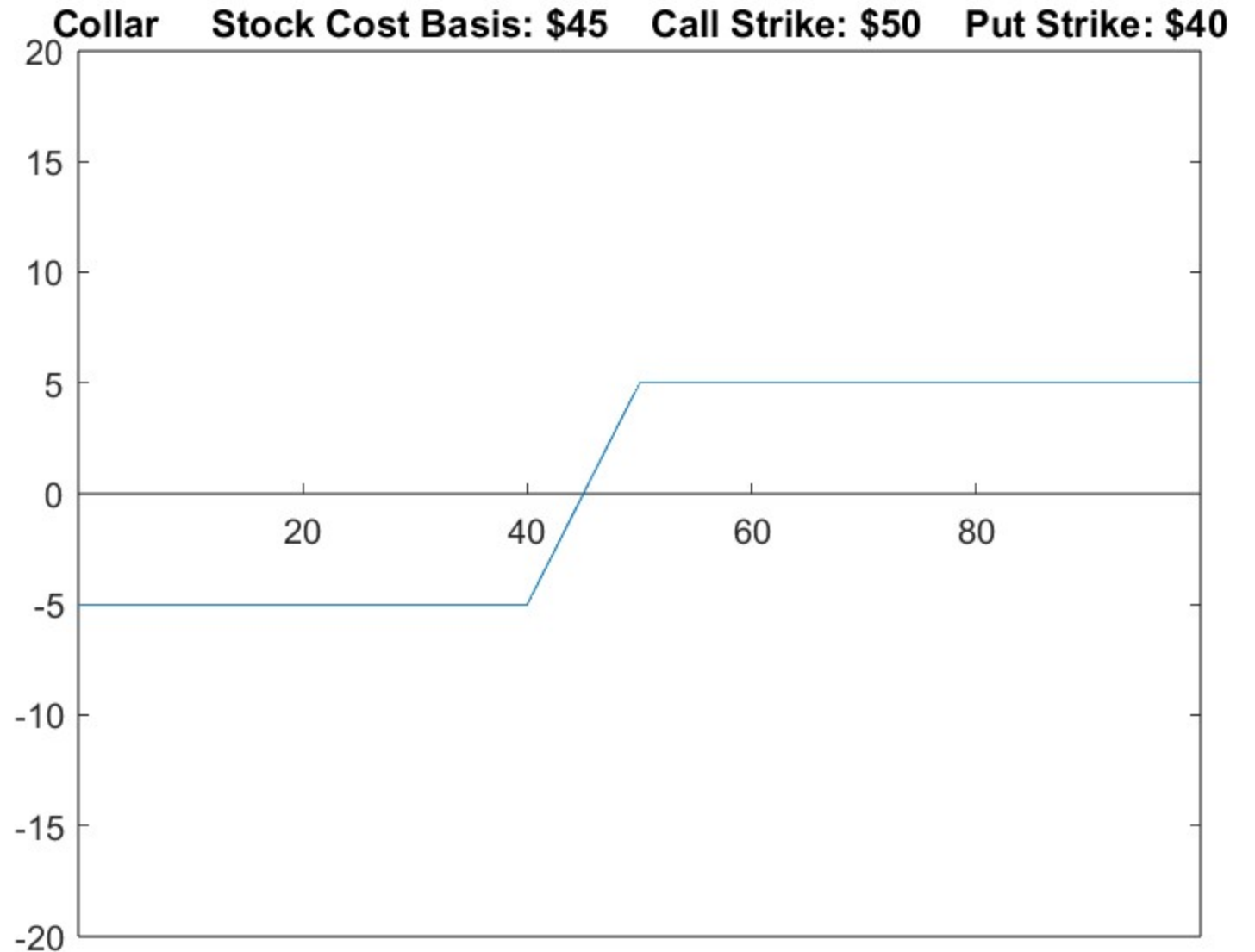
+ Buying Puts

Option Collar

Covered Call

+ Buying Puts

Option Collar

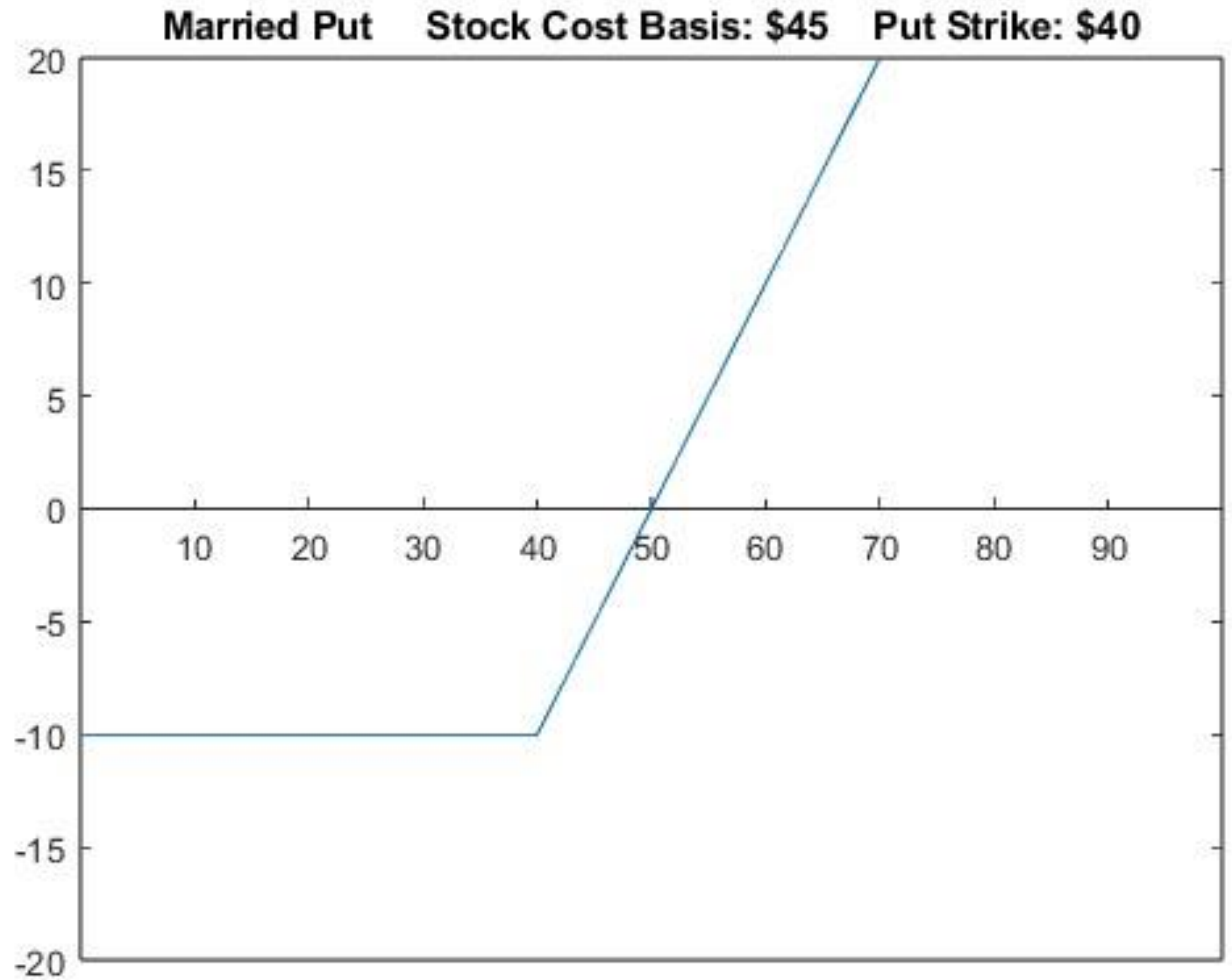


Married Put

Owning the Underlying

+ Buying Puts

Married Put



Who Invests in Derivatives?

Hedgers

Speculators

Arbitragers

Sources

forbes.com/advisor/investing/derivatives/

cmegroup.com

investopedia.com

youtube.com/@PBoyle/videos

<https://workplace.schwab.com/learning-center>

Questions?

MATLAB Files



LinkedIn
Let's Connect!

