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

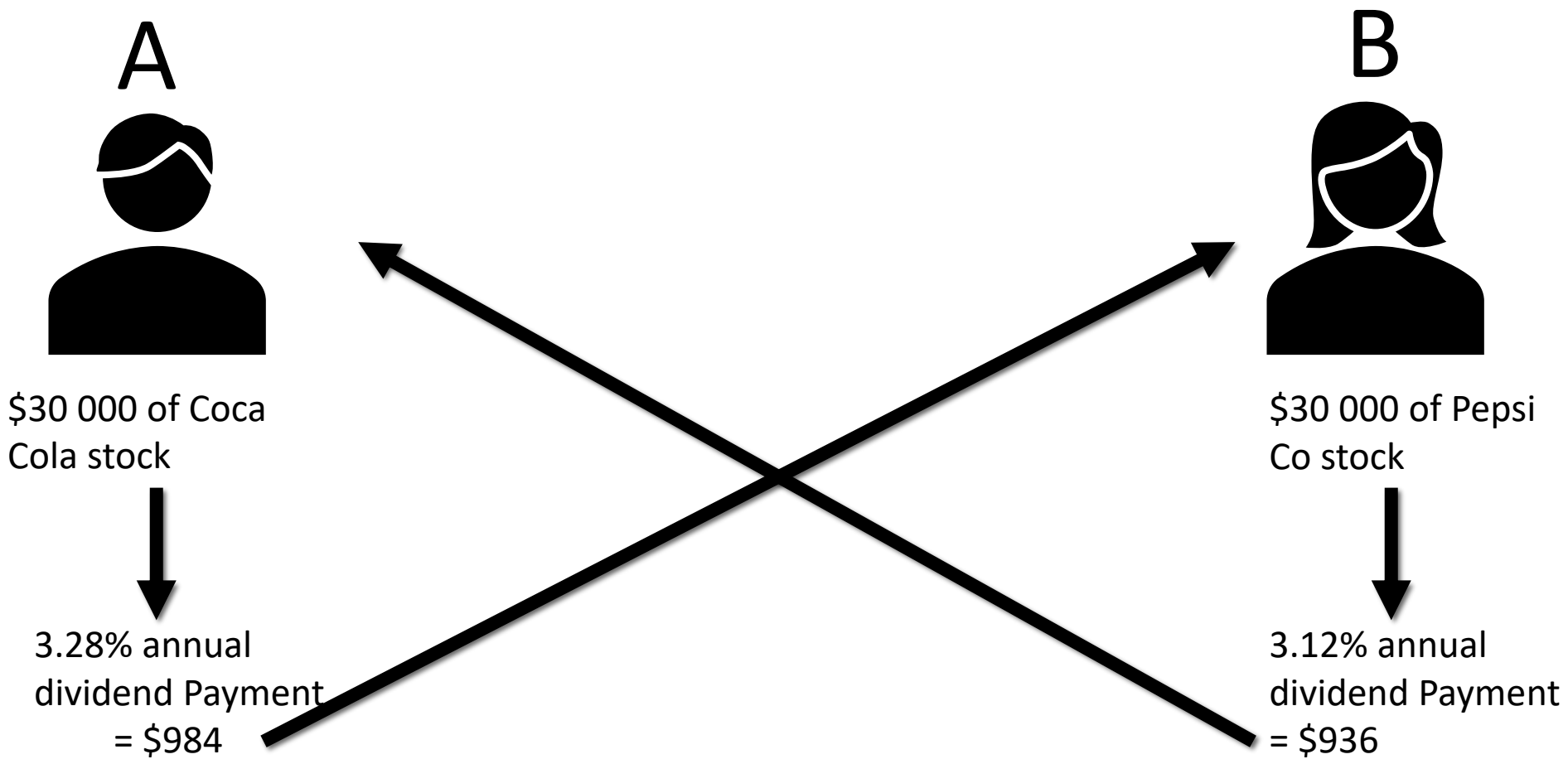
Subject to Counterparty Risk

Swaps

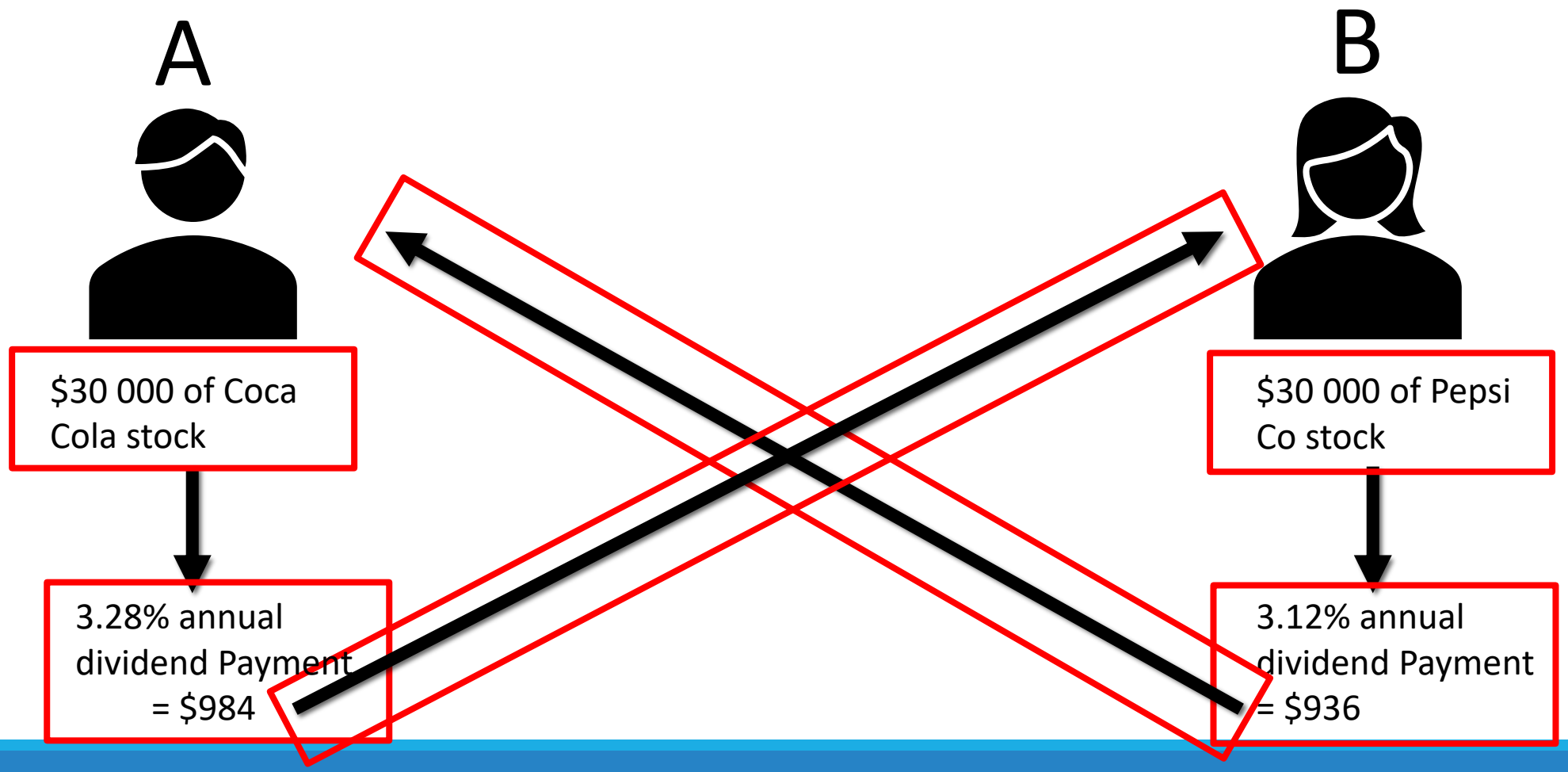
Typically OTC

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

Options

Deliverable

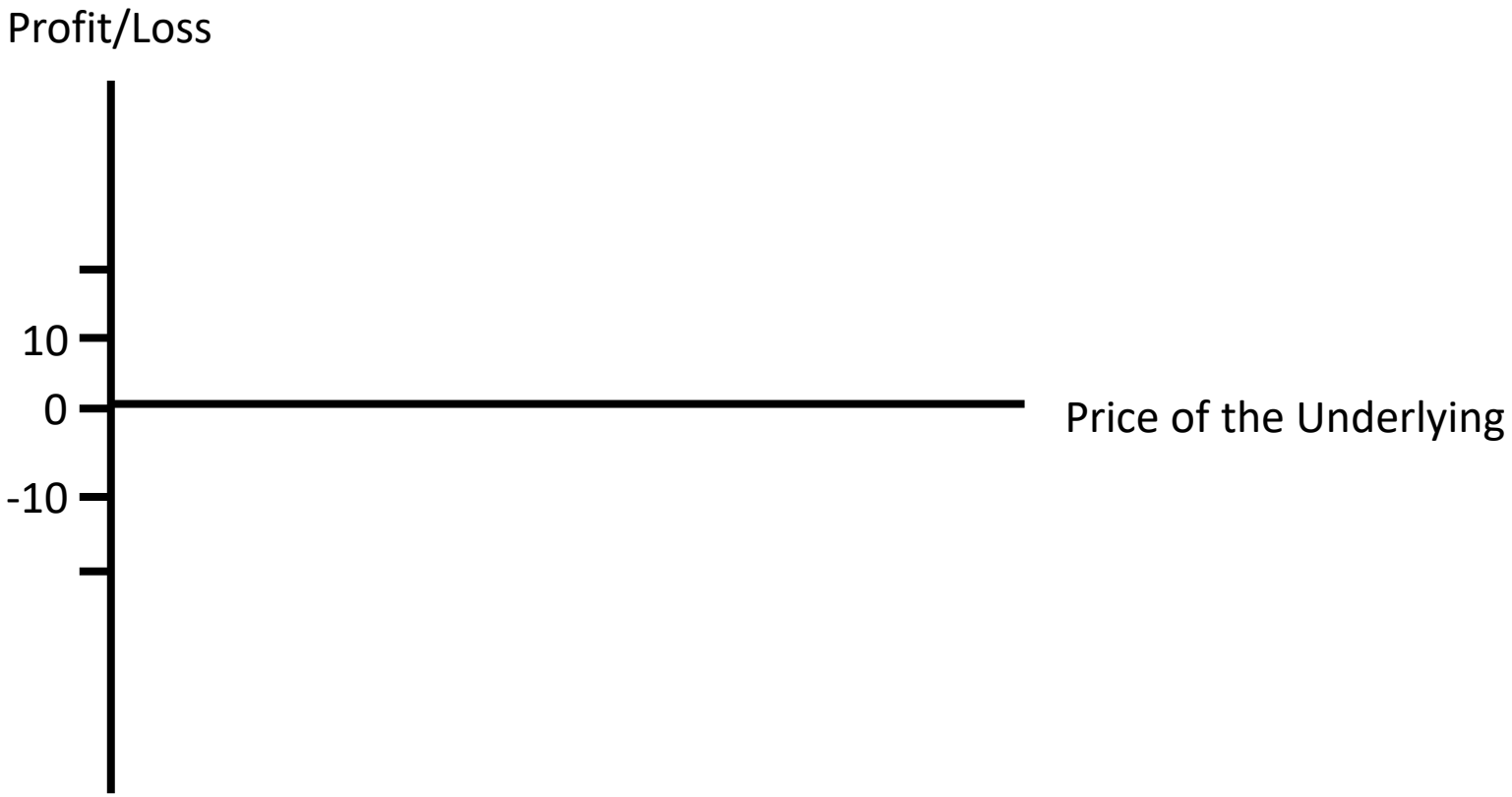
Type (Call or Put)

Strike Price

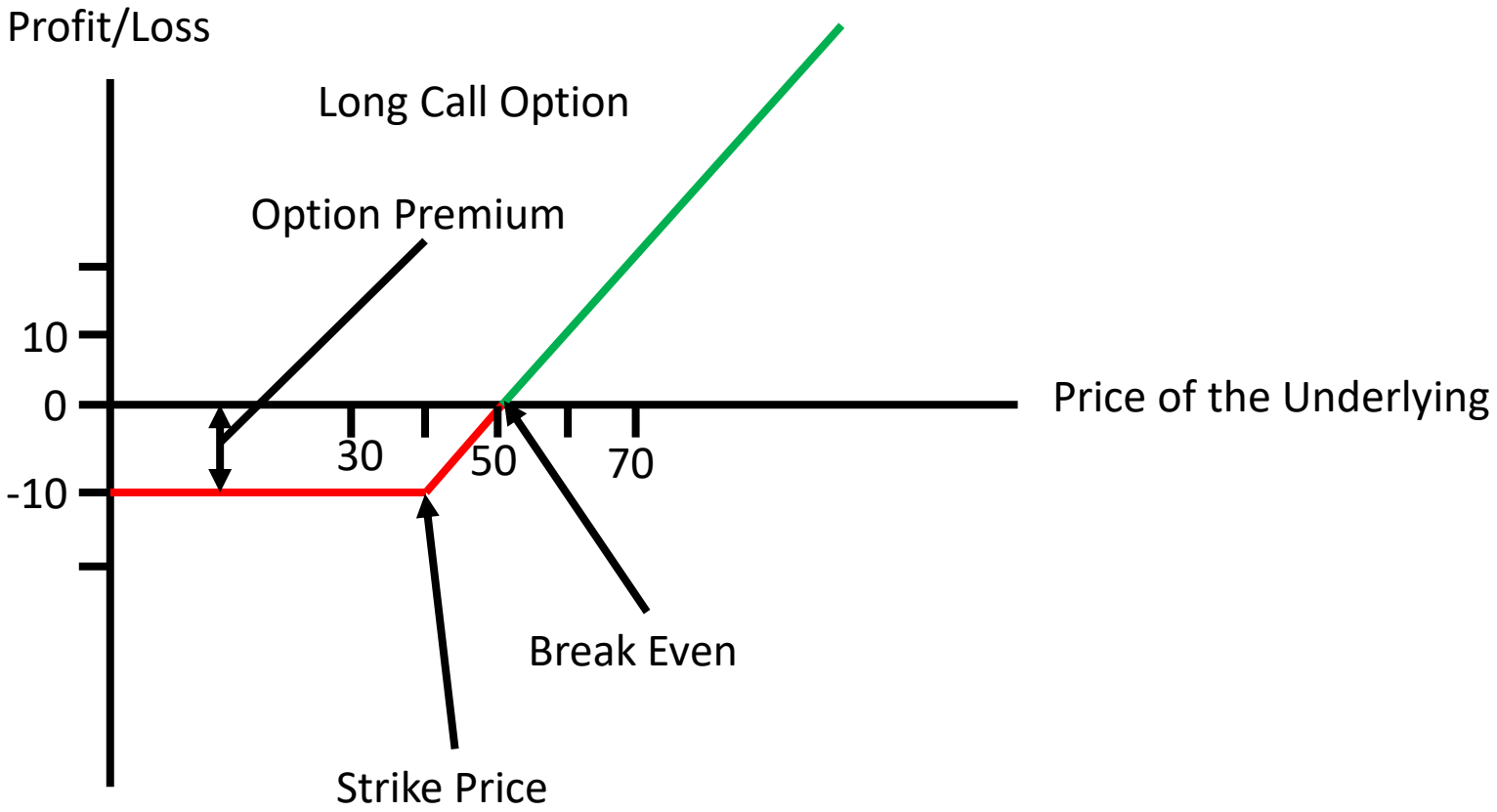
Expiration Date

Option Premium

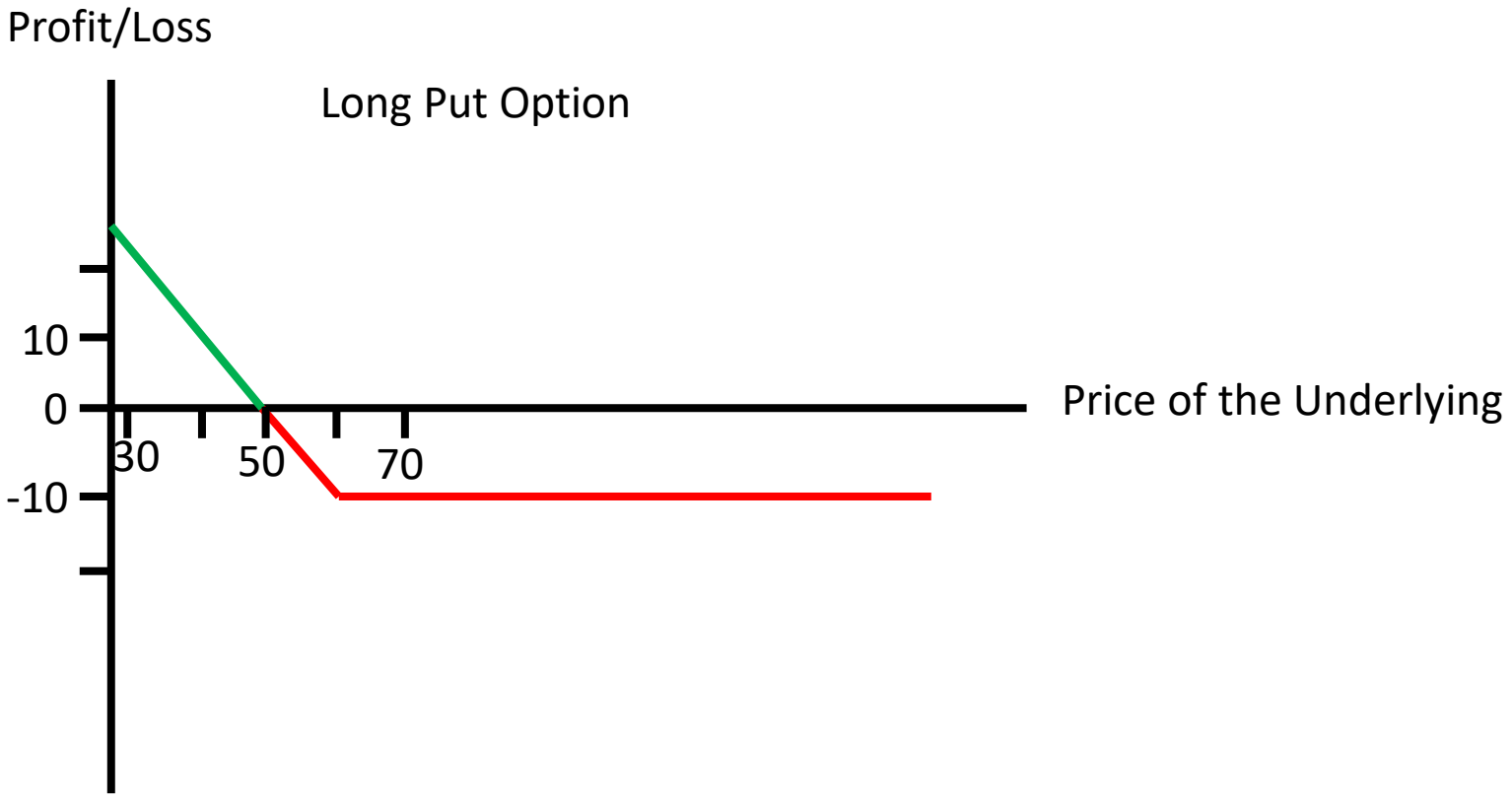
Options



Call Options

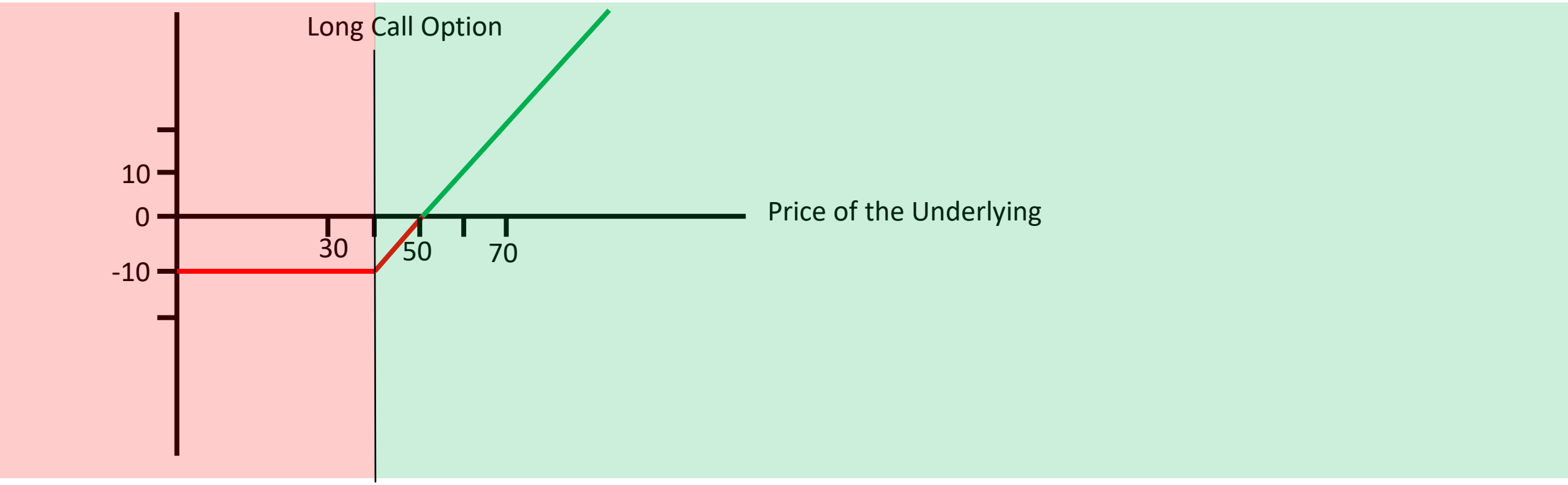


Put Options

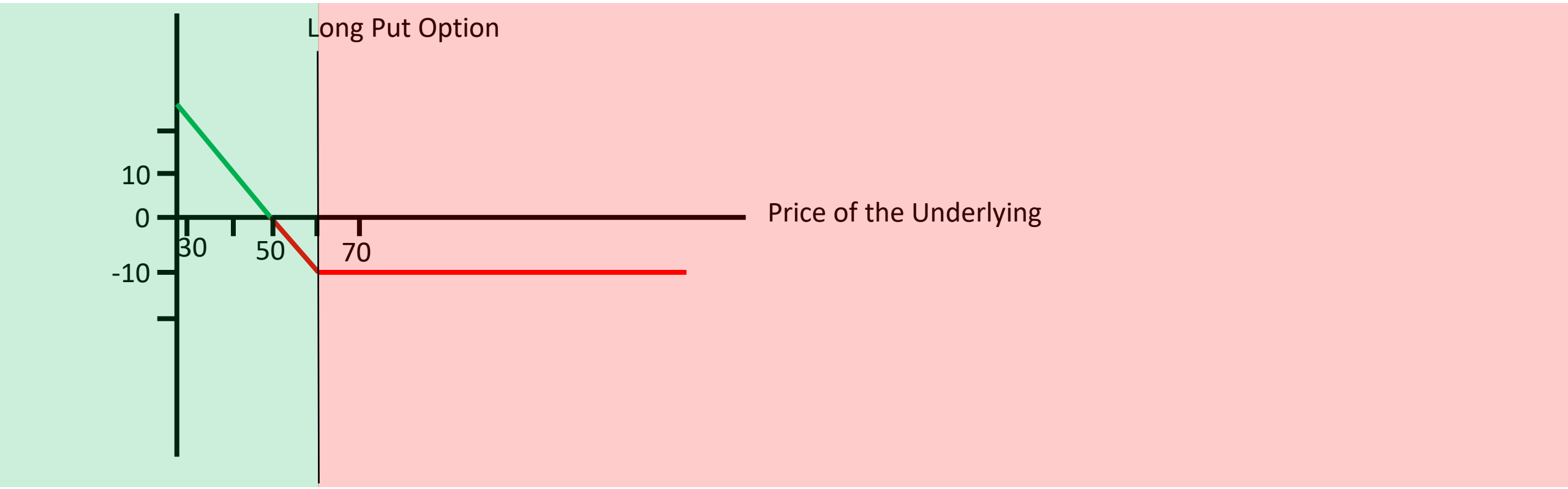

Profit/Loss
Long Put Option
10
0
-10
30
50
70
Price of the Underlying

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

Call Options ITM/OTM



Put Options


Profit/Loss
Long Put Option
10
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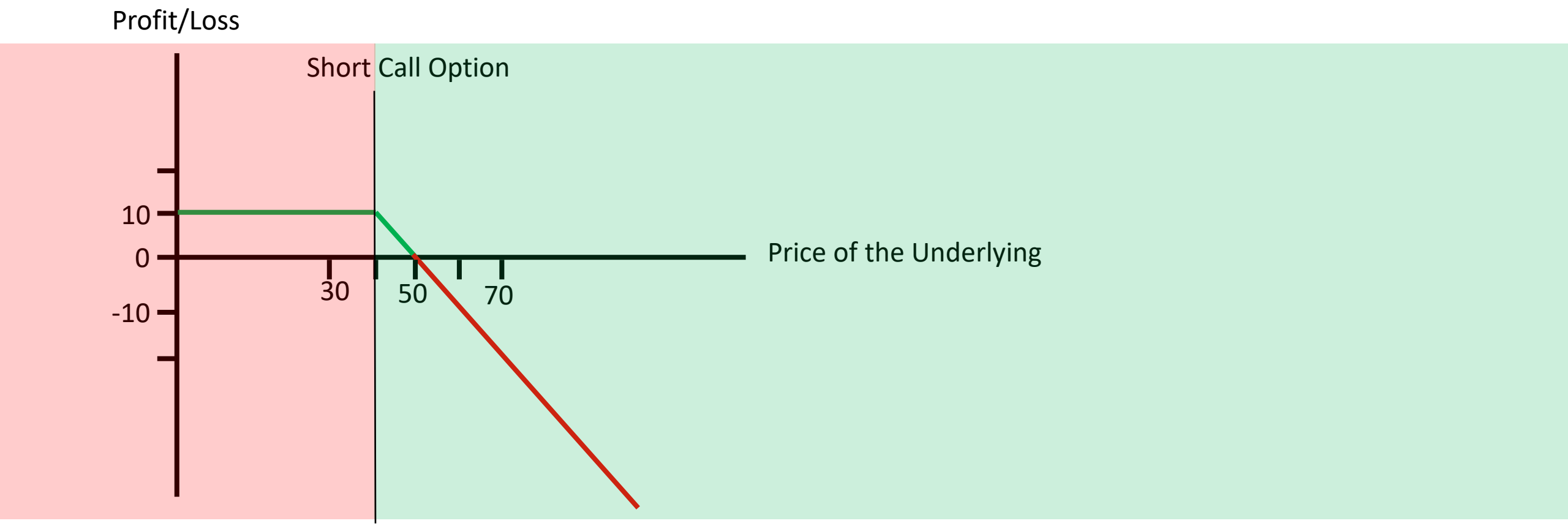
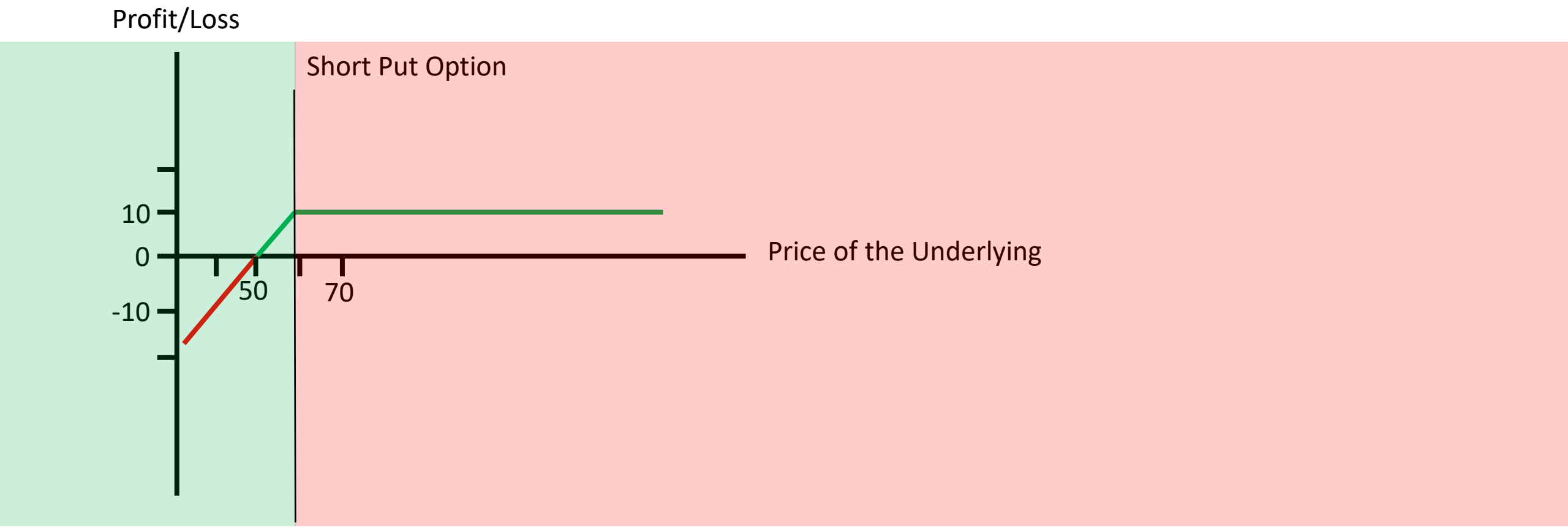
Price of the Underlying

Selling Call Options



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:

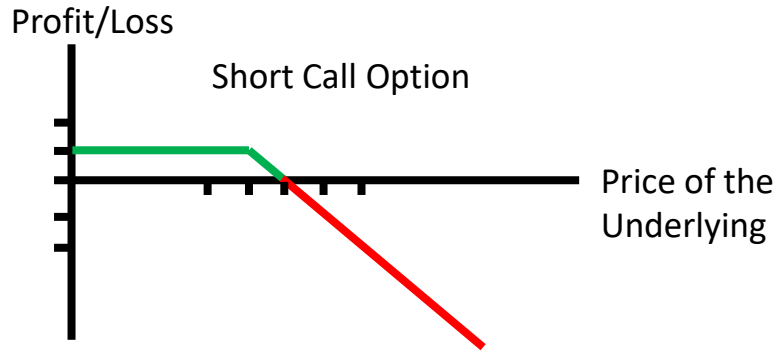
$$f(\text{expirationPrice}) = \text{expirationPrice} - \text{costBasis}$$

Covered Call

Selling Calls + Owning the Underlying

Profit/Loss of Selling Call Option at Expiration:

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



Covered Call

Selling Calls +

Owning the Underlying

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

optionPremium = $10

costBasis = $45

strikePrice = $50

Covered Call

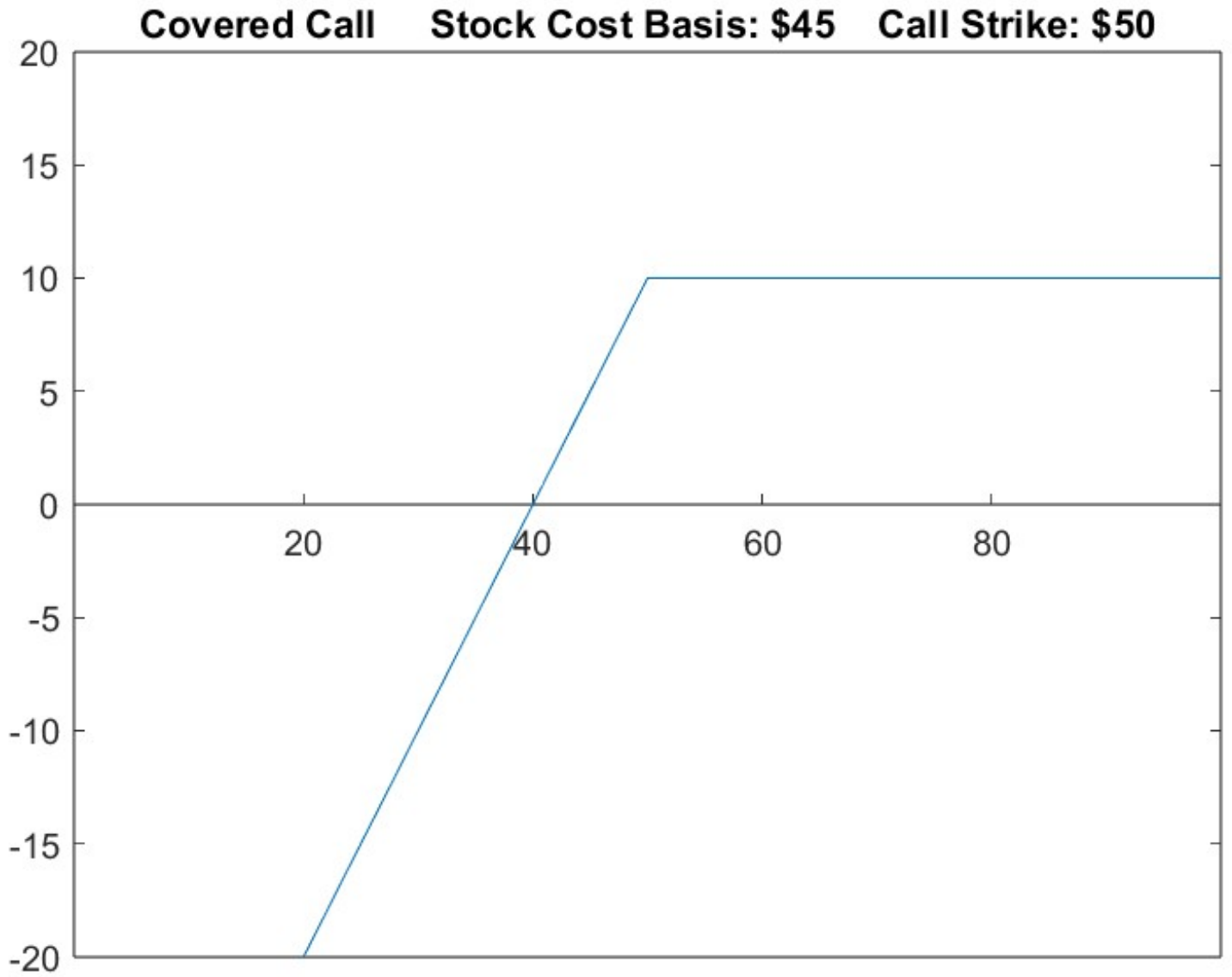
Selling Calls +

Owning the Underlying

optionPremium = $10

costBasis = $45

strikePrice = $50



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

Option Collar

Owning the Underlying

Selling Calls

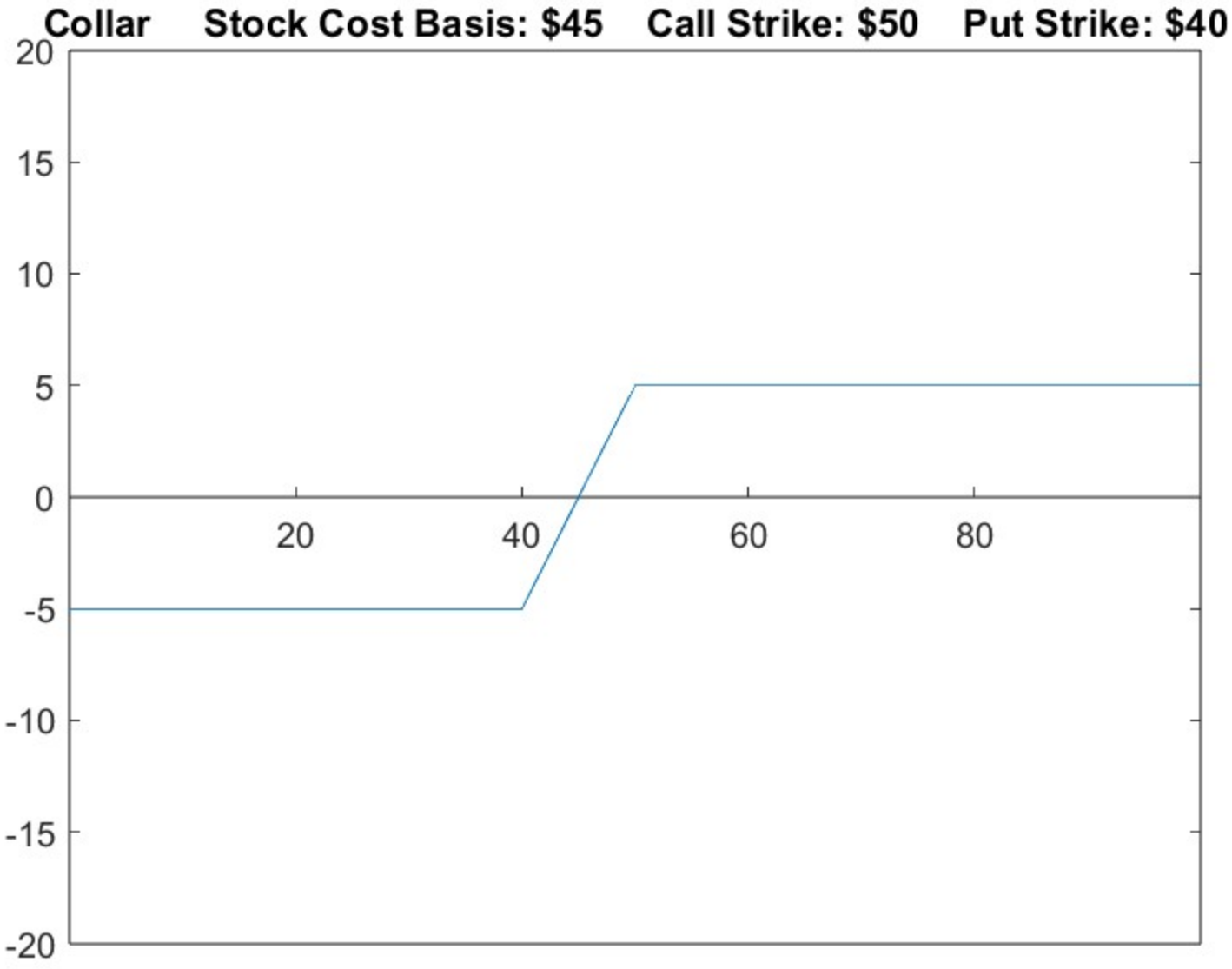
\+ Buying Puts

Option Collar

Covered Call

\+ Buying Puts

Option Collar

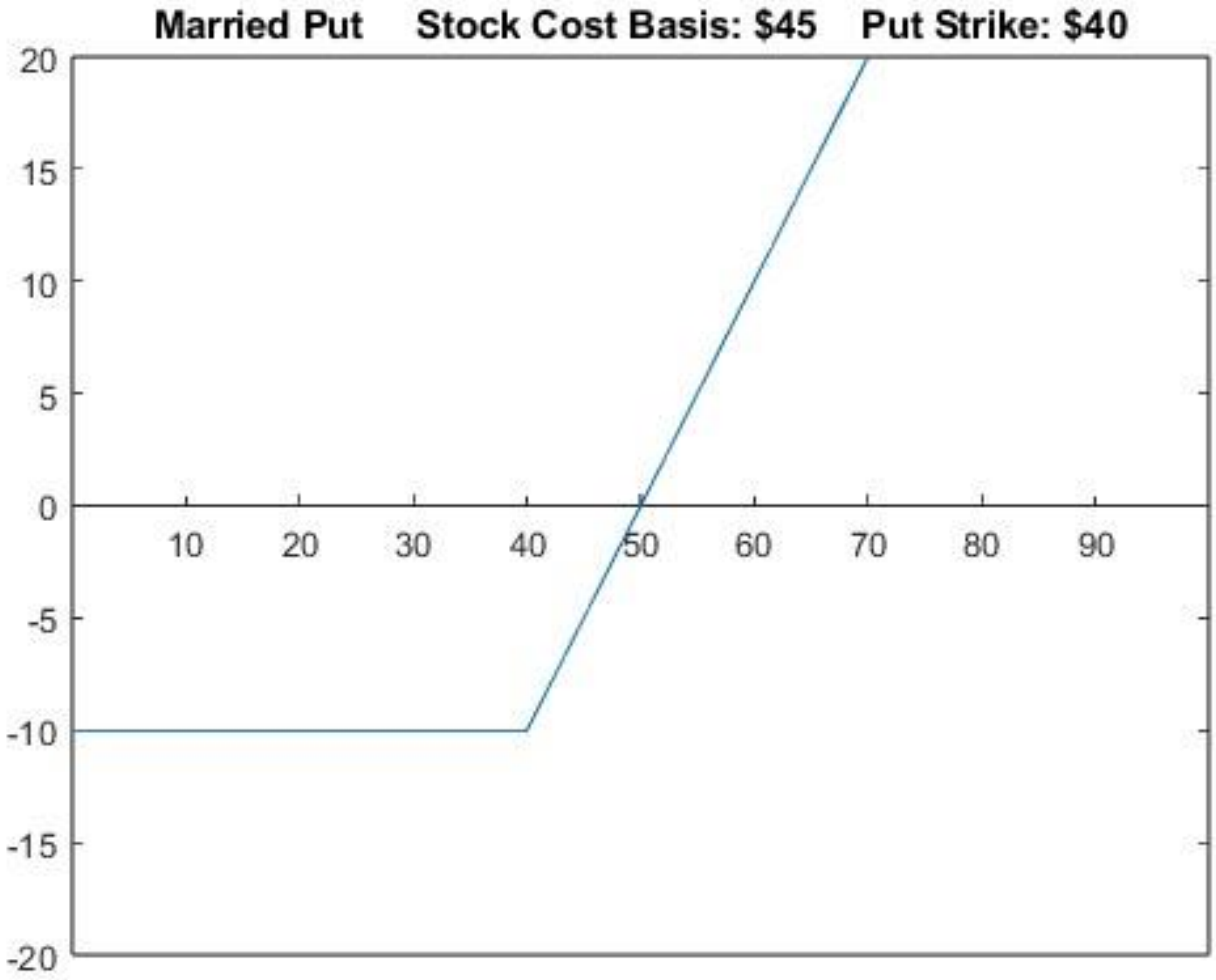


Married Put

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!