



NEW ZEALAND'S EXCHANGE

# Guide to equity options



# Purpose

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This education booklet is designed to provide those with little or no experience trading exchange traded options a comprehensive background into the use and function of equity options.

This guide begins with a background of the NZX Derivatives Market before moving to the concepts of options trading, pricing and trading strategies that are common practice including those strategies we see or expect to see in the NZX Derivatives Market.

## **ABOUT NZX**

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NZX's core purpose is to operate and regulate the securities and derivatives markets in New Zealand, providing trading, post-trade and data services for these markets as it strives to make a meaningful difference to wealth creation for shareholders and the individuals, businesses and economies in which it operates.

NZX launched the Global Dairy Futures and Options market in 2010 to help provide a useful tool for farmers, producers, and manufacturers, among others for the management of price risk inherent to the global dairy industry.

In June 2014, NZX launched an Equity Derivatives Market, offering domestic and international investors the tools needed to manage and gain exposure to the New Zealand capital market.

The NZX Equity Derivatives Market offers index futures contracts based on the S&P/NZX 20 Capital Index and Exchange Traded Options contracts on selected stocks within the S&P/NZX 20 Capital Index.

To view contracts specifications please visit:

### ***Equity derivatives***

[www.nzx.com/markets/NZCX/market-information](http://www.nzx.com/markets/NZCX/market-information)

### ***Dairy derivatives***

[www.nzx.com/markets/nzx-dairy-derivatives/contract-specifications](http://www.nzx.com/markets/nzx-dairy-derivatives/contract-specifications)

## **ACCESS THE MARKET**

In order to get started trading equity options you will need to get in touch with an accredited NZX Derivatives Market Participant. They will take you through the details of options trading, including risk associated with trading, and assist you in setting up an account to trade.

A list of accredited NZX Derivatives Participants is available at: [www.nzx.com/investing/find-a-participant](http://www.nzx.com/investing/find-a-participant)



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# Introduction

Derivatives trading has grown significantly in the past decade in response to economic risk inherent in the trading of commodity and financial instruments. Among the significant contributors to growth include technological advances, increased global communication & cooperation and easier access to global markets for international trade. The development of domestic and international economies has created a unique environment with a number of factors affecting both demand and supply conditions for a variety of different industries.

The core purpose of derivative contracts is the need for individuals and firms to mitigate and control risk and it is this need that has driven growth in global derivatives to become one of the largest and most active industries in the world today.

A derivative, in simple terms, is a contract in which its value is based on (or derives from) the value of something else. The 'something else' can be anything from an agricultural commodity, interest rate, foreign currency or financial instrument – for example tonnes of Whole Milk Powder (WMP) or shares in a publically listed company.

While there are a number of different types of derivatives, the main and most common two are **futures** and **options**.

A **futures** contract is a legally binding agreement between a buyer and a seller to trade a commodity or asset at a set date in the future for a pre-determined price.

An **options** contract is a tradeable agreement which gives the right but not the obligation to buy or sell the underlying asset at an agreed date in the future.

Derivatives are regularly used by a number of participants including producers, manufacturers, banks and financial institutions, private investors and even publically listed companies.

Derivatives market participants generally fall into two categories, **hedgers** and **speculators**. Derivatives markets are designed primarily for those who wish to limit risk that they are exposed to, these participants are known as **hedgers**. There is however, another class of participants who look to use derivatives in an attempt to profit from correctly predicting directional price moves. These participants are known as **speculators** and play an important function in facilitating hedging activity and providing liquidity in a market.

The popularity of derivative contracts and the sheer size of the industry prove that futures and options are diverse tools that can be used to accommodate a vast range of different risk profiles in limiting, maintaining or enhancing exposure to risk in domestic and global markets.

More information on NZX's futures and options contracts is available at [www.nzx.com](http://www.nzx.com)

## QUIZ 1

1. A derivative contract in simple terms is:
  - a. An easy way to return a profit
  - b. A contract in which its value is based on, or derives from, something else
  - c. Something you see in the math classroom at school
  - d. An agreement to sell a commodity at a future date
2. The global development of the derivatives industry is due to a number of factors including:
  - a. Enhancements in technology and communications
  - b. Ease and increase of cross-border (international) trade
  - c. Volatile commodity and asset prices causing the need for viable risk management tools
  - d. All of the above
3. The core purpose of NZX is to:
  - a. Trade shares and derivative contracts for its participants in New Zealand
  - b. Provide a global currency platform for international trade
  - c. Operate and regulate the securities and derivatives markets in New Zealand
  - d. The investment of money for its stakeholders

# The basics of equity options

## WHAT ARE OPTIONS?

An option is a type of derivative contract between two parties (a buyer and a seller). The buyer is purchasing the right to either buy or sell a certain asset at, or before a specific date in the future, at a price agreed today. When applying this to an equity option, the option buyer is purchasing the right to buy or sell shares in the future, at a price agreed today. The option buyer is not obligated to buy or sell the shares; the importance is that they have the right to, but not the obligation.

## FEATURES OF OPTION CONTRACTS

There are five key features of an option contract; four are set by the exchange (NZX), while the fifth, the premium, is determined between the buyer and the seller:

- ▶ Type of option
- ▶ Underlying share/security
- ▶ Strike (or exercise) price
- ▶ Expiry date
- ▶ Premium

### Type of option

There are two different types of option contracts, call options and put options:

A **call option** contains the right (but not the obligation) to buy underlying shares at a date in the future, at a price agreed today, while the seller has the obligation to sell the underlying shares to the buyer should they exercise that right. The seller receives a sum of money for selling their rights to the buyer; this is referred to as the premium.

A **put option** contains the right (but not the obligation) to sell the underlying shares at a date in the future, at a price agreed today, while the seller has the obligation to buy the underlying shares from the option buyer should they exercise that right. The seller receives a sum of money for selling their rights to the buyer; this is referred to as the premium.

	Call option	Put option
Option buyer	Pays premium, Right to buy shares	Pays premium, Right to sell shares
Option seller	Receives premium Obligation to sell shares	Receives premium Obligation to buy shares

## Underlying share/security

Equity options will always have an underlying share associated with it, for example Spark NZ ordinary shares. Shares are often referred to by their 'ticker code', a three-letter code assigned for trading of the shares. For example, Spark NZ ordinary shares are traded under the code SPK.

NZX equity options are linked to 100 shares, so for example, when purchasing a call option, you are purchasing the right to buy 100 shares.

The share price of the underlying is referred to as the spot price.

## Strike price

The strike price, also referred to as the exercise price, is the agreed price at which the underlying shares will change ownership if the option is exercised. A call option with a \$2.50 strike price, therefore, represents the right to purchase shares for \$2.50 should you exercise the option. A range of strike prices is available to be traded, usually at increments of \$0.25.

## Expiry date

Option contracts are listed for a fixed duration, usually no more than 18 months. The expiry date represents the last day in which the contracts can be bought or sold. The expiry date is also the last day in which holders of option contracts can exercise their right contained in the option contract. Equity options expire on the business day before the last Friday of each month. So for example, March options expire on the Thursday before the last Friday of March.

## American vs. European

American style options are those that can be exercised by the holder at any time leading up to the expiry date, whereas European style options are those that can only be exercised on the expiry date. NZX listed equity options are American style.

## Premium

The premium is the cost, or the price of the option. It is the only feature of an option contract that is not set by NZX. Buyers and sellers can post quotes at prices they are willing to buy and/or sell an option contract for. If a buy price (bid quote) and a sell price (offer quote) match, then a trade is created.

## Contract size

One option contract represents a unit size of the underlying. NZX equity options have a contract size of 100 shares.

## Shorthand

Derivative trading is often associated with a lot of jargon and abbreviation. Option contracts are no different, instead of saying you wish to trade a 'Spark NZ call option with a strike price of \$2.50 expiring in December'; it is instead written as 'SPK Dec 2.50 call'.

## What are quotes?

Quotes are the prices (premiums) entered into the trading system by [Authorised Traders](#). They represent prices at which investors are willing to buy or sell option contracts for. Option contracts are quoted per share, as each option contract represents the right to buy or sell 100 shares the price quoted is not the



price you pay. If you are buying a call option for a premium of \$0.50, you are paying \$0.50 per share for the options contract, as the contract represents the right to buy 100 shares, you will be required to pay a premium of  $\$0.50 \times 100 = \$50$  for the call option.

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## BUYER VS SELLER

A person who buys an option contract is often referred to as taking an option, or being the taker. An option taker pays the premium to the seller for the rights contained in an option contract and only the taker can exercise those rights. Once the taker has purchased the option contract they become the holder as they hold the right to exercise the contract. A person who sells an option contract is often referred to as an option writer. A writer receives the premium from the taker for selling their rights.

## BENEFITS OF TRADING OPTIONS

The main benefit in option contracts lies in their versatility. There are a variety of different uses of options contracts from protection against adverse market movements to benefitting from rising and falling prices to increasing exposure to certain shares in a cost effective manner. The range of uses provides the opportunity to tailor one's risk-reward profile to suit individual strategies and provides an investor with much more choice than to simply buy or sell shares.

**For example:** Option contracts can be used as a form of insurance. Just as you would purchase insurance on your car, someone with an interest in a certain share would look for insurance against falling value of his or her investment. If the price of a given share falls then a put option buyer would be protected against this fall, however the individual can still benefit if there is a price rise.

Similar to insurance, to purchase an options contract you are required to pay a 'premium' to the seller of the options contract.

### Generating income

### Protecting the value of your underlying asset

### Directional trading

## RISKS OF TRADING OPTIONS

As options have an expiry date, buyers of options are at risk that the contract expires and they will lose the entire premium they paid while also losing their rights contained in the option contract. An option holder will only exercise their right to buy or sell shares if it is in their interest to do so.

**For example:** If you held a call option with a strike price of \$2.75, while the price of the underlying shares was just \$2.50, you would be better off to just buy the underlying shares at \$2.50, rather than exercising the option contract and purchasing the shares for \$2.75. If the share price does not move higher the option will eventually expire worthless.

Option contracts are also leveraged products. While leverage allows you to increase your exposure to a given share in a cost effective manner, it also increases your risk exposure.

## Leverage

Leverage, in the context of equity options, is the ability to gain exposure to an asset at a fraction of its value. When buying a call option, you pay a premium, which represents a small cost when compared to the value of the underlying shares. In doing so you gain exposure to the underlying shares and subsequent moves in the share price.

**For example:** You buy one XYZ call option for a premium of \$0.25; the total value of the premium is therefore \$25 (\$0.25 premium x 100 shares). You now have exposure to 100 XYZ shares. If the share price of XYZ increases by \$0.10 the price of the option premium will likely also increase by \$0.10. The trader can now sell their option contract for \$0.35 (total value = \$35), realising a profit of \$10 (\$35 sale premium less \$25 purchase premium) a return on investment = 40%.

If, however, you had just purchased the shares at a price of \$1.00 and then sold them at \$1.10 per share (a \$0.10 increase), the return on investment is just 10%.

Another way of explaining leverage is to think what you could do with \$100. If the share price of PQR shares is \$1, then you could buy 100 PQR shares.

Alternatively, PQR options may be trading at a premium of \$0.05. At this price you could buy 20 option contracts for \$100, giving you exposure to 2,000 PQR shares (\$0.05 per share x 100 shares x 20 option contracts). Therefore, in the event of a price rise you can benefit from gains over 2,000 shares, as opposed to 100 shares if you had just purchased the shares.

The risk of leverage is that, while gains are exponential, if the price were to move against your favour then your losses are significantly larger due to your increased exposure.

Leverage Ratio is an important concept in derivatives trading and is used to tell you the amount of exposure you have. This is calculated by dividing the price of the option contract (the premium) by the current share price (spot price). If the premium for a call option is 5 cents and the spot price of the underlying shares, then the leverage ratio is equal to  $2/0.05 = 40:1$ .

This tells you that if you were to consider investing equal portions of money into purchasing shares and purchasing call options you would gain 40 times more exposure when investing in option contracts

## QUIZ 2

1. For each of these options, see if you can identify the main features:

	SPK Feb 2.75 put	FBU Jun 7.00 call
Type		
Underlying		
Strike Price		
Expiry date		

2. A put option writer:

- Pays premium, right to buy shares
- Pays premium, right to sell shares
- Receives premium, obligation to sell shares

d. Receives premium, obligation to buy shares

3. A call option taker:

- a. Pays premium, right to buy shares
- b. Pays premium, right to sell shares
- c. Receives premium, obligation to sell shares
- d. Receives premium, obligation to buy shares

4. A call option writer:

- a. Pays premium, right to buy shares
- b. Pays premium, right to sell shares
- c. Receives premium, obligation to sell shares
- d. Receives premium, obligation to buy shares

5. A put option taker:

- a. Pays premium, right to buy shares
- b. Pays premium, right to sell shares
- c. Receives premium, obligation to sell shares
- d. Receives premium, obligation to buy shares

6. How long are option contracts listed for on NZX's equity derivatives market?

- a. Up to 3 months
- b. Up to 6 months
- c. Up to 12 months
- d. Up to 18 months

# Option pricing

## INTRINSIC VS. TIME VALUE

The price of an option contract (premium) is generally made up of two main components, the intrinsic value and the time value.

### Intrinsic value

An option contracts intrinsic value is based on the positive difference between the options strike price and the current price of the underlying share (spot price).

A call option has intrinsic value if the spot price is greater than the strike price, while a put option has intrinsic value if the spot price is less than the strike price. An option contract cannot have negative intrinsic value; therefore if the spot price is less than the exercise price of a call option, the intrinsic value is \$0.

Call option has intrinsic value if:  $\text{spot price} > \text{strike price}$

Put option has intrinsic value if:  $\text{spot price} < \text{strike price}$

**For example:** The strike price of a XYZ call options is \$5.00 and the spot price is \$5.50; therefore the intrinsic value of the option contract is \$0.50 (spot price \$5.50 – strike price \$5.00 = \$0.50). The \$0.50 represents the value of the option contract, i.e. the amount that can be realised if the contract were to be exercised.

The table below illustrates a few examples of calculating intrinsic value on XYZ option contracts; assume the spot price is \$5.00.

Option Type	Strike price	Spot price	Calculation	Intrinsic value
Call	\$4.25	\$5.00	$\$4.25 = \$0.75$	\$0.75
Call	\$5.50	\$5.00	$\$5.50 = -\$0.50$	\$0.00
Put	\$4.50	\$4.50	$\$5.00 = -\$0.50$	\$0.00
Put	\$5.25	\$5.25	$\$5.00 = \$0.25$	\$0.25

### Time value

The remainder of the premium is referred to as the 'time value'. Like its name suggests, it is based on the amount of time the option contract has left before it expires. The time value decreases the closer a contract gets to expiry, so that on expiry of an option contract, there is no time value and the entire premium is made up of intrinsic value (if anything).

### In-the-money/out-of-the-money/at-the-money

An option is in the money (ITM) if the contract has intrinsic value. A call is ITM if the spot price is greater than the strike price. A put is ITM if the spot price is less than the strike price.

An option is at-the-money (ATM) if the strike price of an option is equal to the spot price of the underlying shares. This rule applied for both call options and put options.

An option is out-of-the-money (OTM) if the spot price is less than the strike price for a call, and the spot price is greater than the strike price for a put.

Call option		Put option
Spot price > strike price	ITM	Spot price < strike price
Spot price = strike price	ATM	Spot price = strike price
Spot price < strike price	OTM	Spot price > strike price

## **FACTORS INFLUENCING PRICE**

Option pricing is complex and most professional traders will have their own models; the main components that influence price are:

- ▶ Price of the underlying share
- ▶ The strike price
- ▶ The amount of time left until the contract expires
- ▶ The risk free interest rate
- ▶ The volatility of the underlying share price
- ▶ Expected dividends of the underlying share

### **Price of the underlying**

The underlying share price in relation to the strike price is the single most important factor in option pricing. For call options, high spot prices in relation to the strike price will result in a greater intrinsic value at expiry, therefore a greater premium.

### **Strike price**

Lower strike prices for a spot price will lead to large intrinsic value for calls and small intrinsic value for puts, therefore affecting premiums. For example: If a call option has a strike price of \$4.50 and the underlying share price is \$5.00, there is \$0.50 of intrinsic value. If the strike price were \$4.00 however, there is \$1.00 of intrinsic value. \$3.50 strike price = \$1.50 intrinsic value and so on. The inverse is applicable for put options with higher strike prices resulting in higher intrinsic value.

### **Time left until option expires**

The longer the duration of the option contract, the greater the chance that the contract will become in the money or increase in value, therefore contracts with a far dated expiry are more expensive than contracts that are close to expiry.

### **Risk free interest rate**

The risk free interest rate is the theoretical rate of return from an investment that has no risk. The risk free rate is added to the risk premium to determine the minimum expected return required in order to induce an investor to take up an investment with risk rather than an investment with no risk i.e., bank deposit.



Option contracts contain risk; therefore the writer (seller) will require a risk premium to justify their decision to sell their rights contained within the option contract. An increase in the risk free rate generally leads to an increase in the premium for a call option, and a decrease in premium for a put option.

### Volatility

An increase in the volatility of the underlying share price will increase the premium for both call and put options. Volatility is a measure of the degree to which a given share price changes over time. High volatility means that the underlying share price can potentially move across a greater range (upward or downward) in a given time period, therefore demanding a higher premium. The inverse is applicable for low volatility.

### Expected dividends

As shares often pay dividends, this can impact the price of premiums. An increase in the value of an expected dividend will cause the potential payoff for a call option to decrease, while the potential payoff for a put option will increase.

### QUIZ 3

1. Using the information below calculate the intrinsic value on these option contracts:
  - a. A call option with a strike price of \$2.00, the spot price is \$2.90  
**Intrinsic value = \_\_\_\_\_**
  - b. A put option with a strike price of \$4.25, the spot price is \$4.45  
**Intrinsic value = \_\_\_\_\_**
  - c. A put option with a strike price of \$6.00, the spot price is \$5.55  
**Intrinsic value = \_\_\_\_\_**
  - d. A call option with a strike price of \$0.50, the spot price is \$6.25  
**Intrinsic value = \_\_\_\_\_**
  
2. What is the time value of the following option contract premiums:
  - a. A \$2.50 Dec ABC call is selling for a premium of \$0.45. ABC shares are trading at \$2.90.  
**Time value = \_\_\_\_\_**
  - b. The premium of an ABC call option is \$0.72. The strike price of the option was \$2.00, the spot price of ABC shares is \$2.50  
**Time value = \_\_\_\_\_**
  - c. The last trade price on an ABC \$4.75 put option was \$1.00, representing an intrinsic value of \$0.38  
**Time value = \_\_\_\_\_**
  - d. What is the spot price of ABC shares in question c) above?  
**Spot price = \_\_\_\_\_**
  
3. For each of the following option contracts determine if they are In the money, out of the money or at the money:

Strike/option type	Spot price	ITM/OTM/ATM
\$10.00 call option	\$10.00	
\$500 call option	\$502.5	
\$3.75 call option	\$3.00	
\$6.00 put option	\$6.20	
\$12.50 put option	\$12.50	

4. If volatility increases, the time value portion of an options contract generally \_\_\_\_\_.

# Trading options

## TYPES OF TRADERS

Categorically there are three different types of traders: Hedgers, Speculators and Arbitrageurs.

1. **Hedgers** have an interest in the underlying market and are seeking to mitigate risk by creating price certainty, it is likely that they own shares or are anticipating buying shares. Option contracts are used primarily to manage risk of movement in share prices.
2. **Speculators** do not have a direct interest in the underlying market and rather trade option contracts in the attempt to profit by predicting market movements. As option contracts are leveraged products, speculators see them as attractive tools for gaining exposure to specific shares at a fraction of the cost of owning the underlying shares.
3. **Arbitrage traders** seek to make risk free profits from price discrepancies between the share price and the price of options, or between the price of varying option contracts with different types and/or different strike prices. Arbitrage traders are quick to react to mismatches in prices between markets and will quickly restore these to equilibrium.

## Which option to buy or sell

Determining whether or not to buy or sell an option contract, and also determining which contract to buy or sell is no easy task as these choices are influenced by investor's different situations and desired objectives. While you can determine whether you are a hedger, speculator or trading arbitrage, you can also determine your market opinion using the following derivative terms:

**Bullish** – a commonly used derivative term describing someone who thinks a certain share price (or the market in general) is going to rise.

**Bearish** – a commonly used derivative term describing someone who thinks a certain share price (or the market in general) is going to fall.

**Neutral** – a term applied to someone that is neither bullish nor bearish on a certain share price or the market in general. They believe the share price will remain constant.

## Naked and covered

The difference between a naked option and a covered option is that; covered options are contracts traded by those who actually own the underlying shares, while naked options are contracts traded by those who do not own the underlying shares. Writers of option contracts run the risk of their option contract being exercised therefore they have unlimited risk or loss potential (are naked).

Covered option strategies generally are based around the management of risk (hedging). Covered options can be used to hedge future risk; limit losses; or help to reduce purchase price of shares.

Those wishing to express a view and profit from predicting price movements (speculating), often use naked option strategies. These types of strategies allow traders to freely trade the options market without having to have an involvement in the share market, however these strategies also bear greater risk.

## HOW ARE OPTIONS TRADED?

Option contracts are traded in the same manner as shares are traded, on a trading platform operated and regulated by NZX. It can enter quotes onto NZX's order matching system on behalf of their clients. If a bid quote and an offer quote match, then a trade is created.

Those who sell option contracts are required to post a performance bond/margin to the Clearing House. This acts as a guarantee that, should the option contract be exercised, the writer will be able to fulfil their obligations of the contract.

### **Performance bond/margin**

As above, option writers are required to post a performance bond or margin when selling contracts. This margin is deposited to a market participant (usually your broker) who in turn must post this with the Clearing House. Margin can be in a number of different forms such as cash, bank guarantees or the underlying shares relating to the option contract.

## WHAT CAN HAPPEN TO OPTION POSITION

Once you hold an option contract, there are three ways in which you can exit this position:

- ▶ Offset
- ▶ Exercise
- ▶ Expire

### **Offset**

Offsetting options is achieved by making the opposite transaction to the one you took to enter into the position. For example, selling the option contract you previously purchased, or buying the option contract you previously sold. This is common in option trading, particularly if the value of the premium has changed in value to the trader's benefit.

**For example:** If you sold a put option for a premium of \$0.85 last week and the price changes so that the option contract is now trading at \$0.50. You can buy the option contract, therefore exiting your position and taking a profit of \$0.35 (\$0.85 sell price less \$0.50 buy price). If you have sold a call option or a put option, offsetting is the only way to avoid being exercised against.

### **Exercise**

The right to exercise an option contract (whether it is a call option or a put option) lies with the holder because, as highlighted earlier, the holder holds the rights to exercise the contract.

If the option contract is in-the-money, and therefore in the buyer's best interest to exercise the option contract, then the buyer can exit the position by exercising the option. The buyer will need to notify their broker that they would like to exercise the option contract. The broker will then lodge an exercise request with the Clearing House. In lodging a request this will create a share transaction at the strike price and you will need to complete the relevant side of the transaction (i.e. buy shares if it is a call option you are exercising).

	Call option	Put option
Option buyer	Pays strike price Receives shares	Gives shares Receives strike price
Option seller	Receives strike prices Gives shares	Receives shares Pays strike price

## Expire

The third and final choice you have to exit a position is to do nothing and let the option contract expire. The fact that option contracts have a fixed expiry date is one of the advantages for options traders as:

- ▶ For those selling writing options, they are only selling their rights for a given length of time.
- ▶ For those buying option contracts, the maximum amount you can lose is set by the premium you paid. Should the price of the underlying shares not move in your favour, you have certainty over the maximum loss you can incur and therefore quickly move on to changing your strategy.

Also, should you be in a position in which you have bought an option contract and it is about to expire in-the-money, by doing nothing and letting it expire, this will automatically initiate an option exercise without having to lodge a request with your broker.

**For example:** If you hold an in-the-money call option with a strike price of \$2.50 and you let the option contract expire, on expiry the contract will automatically exercise resulting in you purchasing 100 shares for \$2.50 each (total value equals \$250). Let's assume the current share price is \$3.00, in this case you instantly have a portfolio of shares with greater value than your purchase price. Should you wish to cash in on this financial gain you can sell your shares for \$3.00 per share and collect the \$0.50 gain.

## QUIZ 4

1. What type of trader is a person that uses option contracts to express their view on, and make a profit from predicting movements in the share price of a company?  
\_\_\_\_\_
2. If I am long on an in-the-money call option, what options do I have to exit this position?
  - a. Sell back the option
  - b. Buy back the option
  - c. Exercise the option
  - d. Let the option expire
  - e. a., b. & c.
  - f. a., c. & d.
  - g. b., c. & d.
3. A writer of a call option can do what if they wish to close their position?
  - a. Buy the option
  - b. Exercise the option



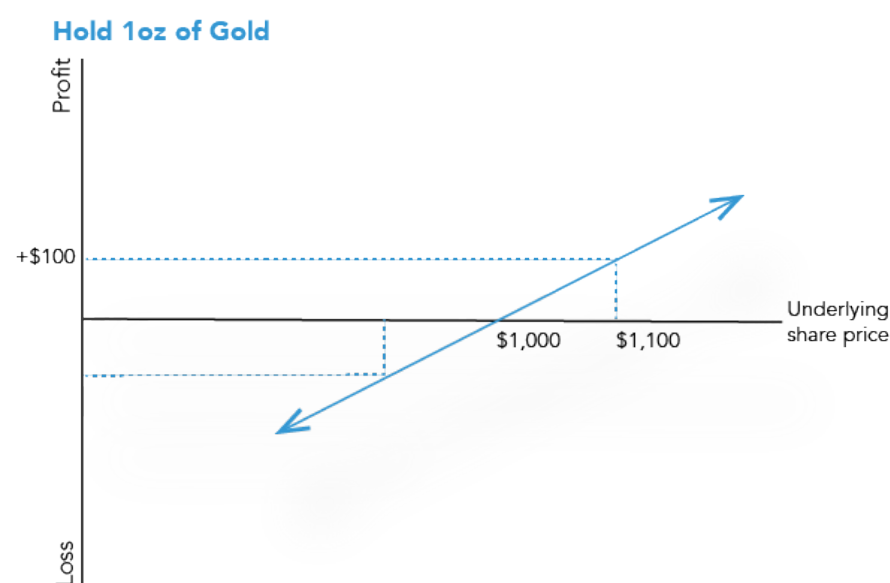
- c. Let the option expire
  - d. All of the above
  - e. a. & c.
4. What will happen to an in-the-money put option on expiry:
- a. Nothing
  - b. The contract expires worthless
  - c. The contracts automatically exercises
5. The writer of a call option who is naked receives notice from their broker that their option contract is being exercised. The writer:
- a. Is obligated to sell shares to the option taker
  - b. Must purchase shares to sell to the option taker
  - c. Is likely to lose money as the option is in-the-money
  - d. Needs to put some clothes on
  - e. a., b. & c.
6. What two factors have the greatest influence in the value of the option premium?
- a. Time and interest rates
  - b. Interest rates and volatility
  - c. Volatility and time
  - d. Time and intrinsic value

# Pay-off diagrams

Payoff diagrams can often be a useful way to illustrate the expected return from a given asset; they can be particularly useful in illustrating the expected return from an option position or strategy taken on as well. A payoff diagram graphs the relationship between a change in the value of an asset with the resulting expected profit or loss from the change in value. The horizontal axis (x-axis) represents the spot price of underlying assets, the vertical axis (y-axis) represents an investor's expected profit or loss if they were to hold that asset.

An investment in a standard asset or commodity (such as gold) is linear; if the value rises, profit rises by a proportionate amount.

**For example:**



If the gold spot price rose from \$1,000 per ounce to \$1,100 per ounce, then you would profit \$100. The opposite would happen if the price fell by \$100.

The four basic strategies for options trading are:

1. Buy a call (long call)
2. Sell a call (short call)
3. Buy a put (long put)
4. Sell a put (short put)

The information below will highlight when each of these strategies is useful, their expected profit, loss and break-even point and also illustrates their expected returns using payoff diagrams.

## 1) Buy a call option

**Strategy name:** A long call

**When to use:** When you are bullish on the underlying share price. Profit increases as the underlying share

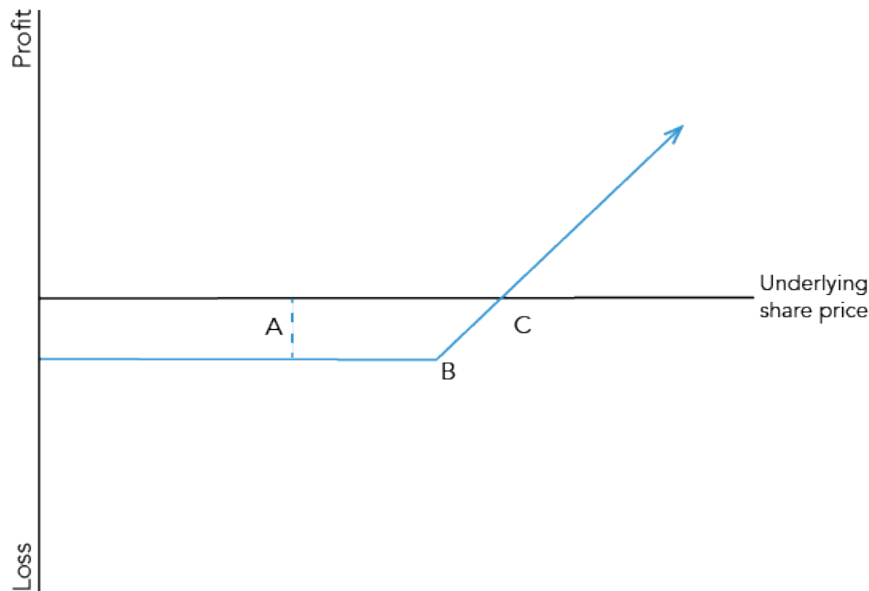
price increases above the break-even point. Loss is limited to the value of the premium paid to the seller (writer) of the option contract.

**Profit:** Unlimited in rising market

**Loss:** Limited to premium paid (A)

**Break even:** When underlying share price is equal to strike price plus the value of the premium paid (C)

### Long Call Strategy



**Description:** As with long calls, you pay a premium for the right to buy the underlying shares. The cost (premium) is illustrated by distance A. This represents the maximum loss potential you can incur. Point B represents the strike price for the call option and point C represents the break-even point (strike price + premium).

### 2) Sell a call option

**Strategy name:** A short call

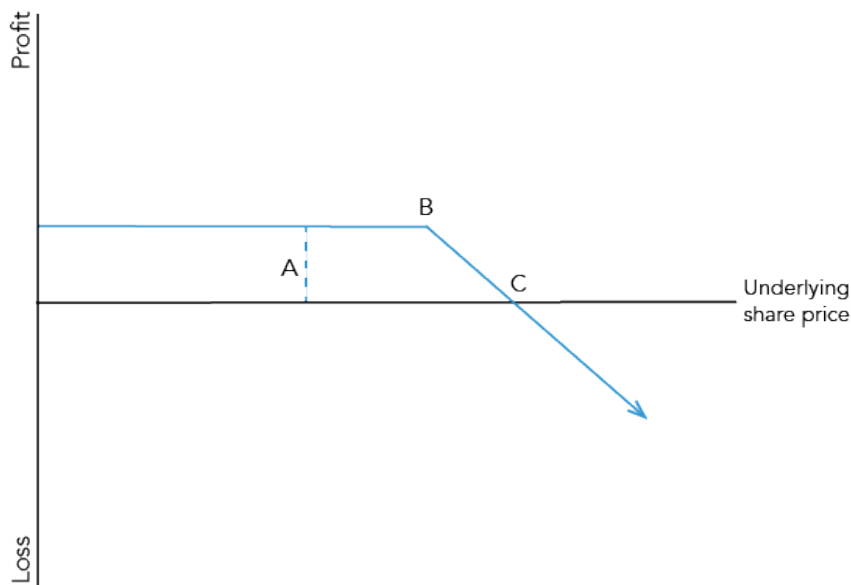
**When to use:** When you are bearish, neutral negative or neutral on the underlying share price. A short call is an attractive strategy used to generate additional income however is risky due to unlimited loss potential should the share price significantly rise.

**Profit:** Limited to premium received

**Loss:** Unlimited in rising market

**Break even:** When underlying share price is equal to strike price plus the value of the premium received

### Short Call Strategy



**Description:** This is the opposite strategy to a long call. You receive a premium from the buyer, illustrated by distance A; this is the maximum potential profit you can gain from a short call strategy. Point B represents the strike price of the option contract and point C represents the break-even point (strike price + premium).

### 3) Buy a put option

**Strategy name:** A long put

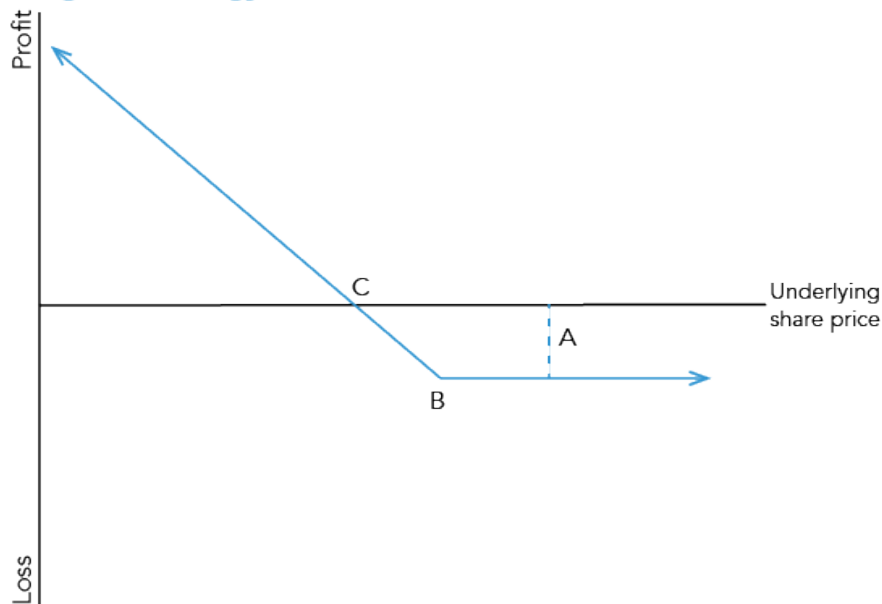
**When to use:** When you are bearish on the market. Should the share price rise, the maximum loss potential is limited to the value of the premium paid. The more the share price falls, below the break-even point, the more profit you make.

**Profit:** Unlimited in falling market

**Loss:** Limited to premium paid

**Break even:** When underlying share price is equal to strike price less the value of the premium paid

### Long Put Strategy



**Description:** When buying a put option you pay a premium (A), this represents the maximum loss potential of this strategy. Point B represents the strike price and point C is the break-even point of this strategy. Should the price fall beyond point C you would likely exercise the put option and sell your shares at the higher strike price.

#### 4) Sell a put option

**Strategy name:** A short put

**When to use:** When you are neutral, neutral positive or bullish on the underlying share price. There is unlimited loss potential should the share price decrease significantly, while profit is limited to the premium received from the option buyer (taker).

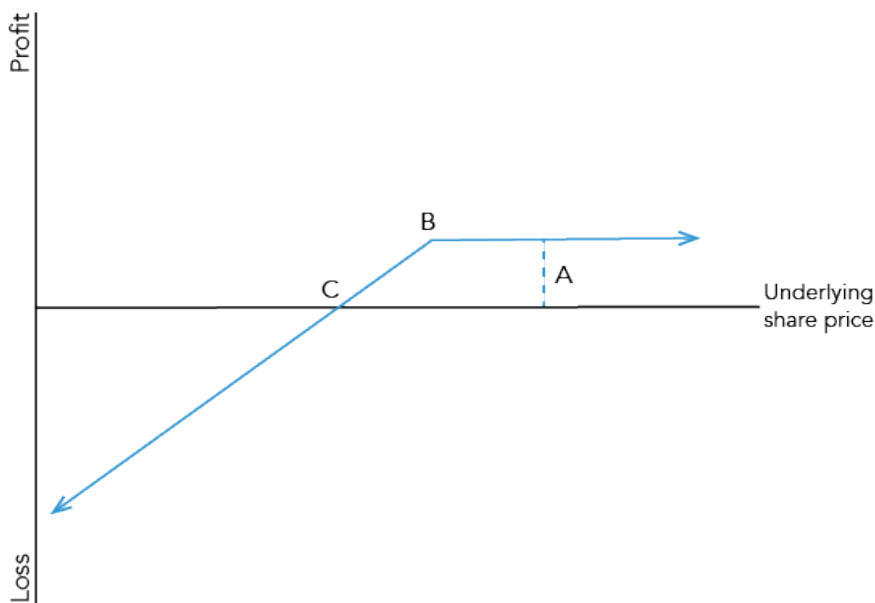
**Profit:** Limited to premium received

**Loss:** Unlimited in falling market

**Break even:** When underlying share price is equal to strike price less the value of the premium received



### Short Put Strategy



**Description:** When selling put options the opposite payoff occurs compared with buying a put. You receive the premium (A) which is the maximum profit potential of this strategy. Should the strike price fall below the break-even point (C) then you stand to make a loss. B represents the strike price of this strategy and is the price that, should the contract be exercised, you will pay to buy the underlying shares from the option buyer.

### PRACTICE EXAMPLES: PAYOFF DIAGRAMS

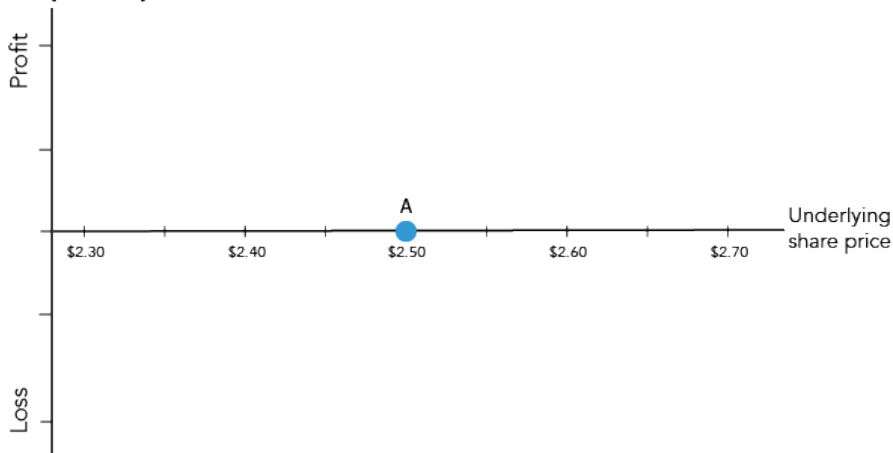
#### Example one

The information above explains how a payoff diagram works, but how do you go about drawing your own given the required information?

Let's assume you are looking to buy a call option that has a strike price of \$2.50 and a premium is \$0.10.

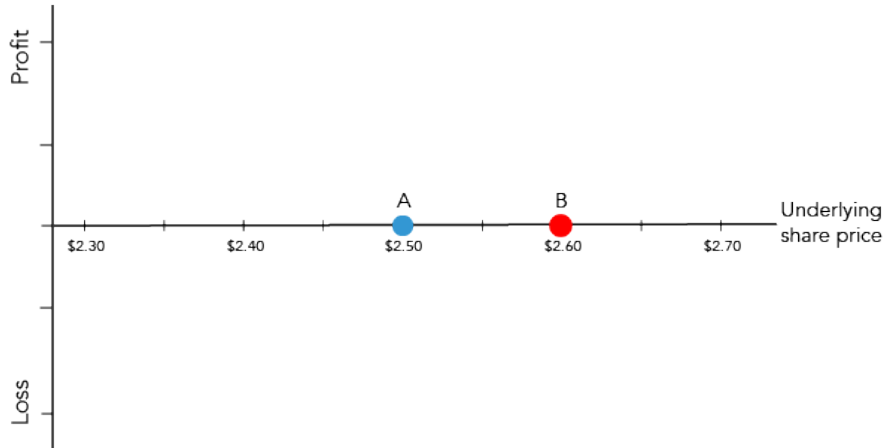
The first thing to do is mark the strike price on the x-axis (A)

#### A - (x-axis)



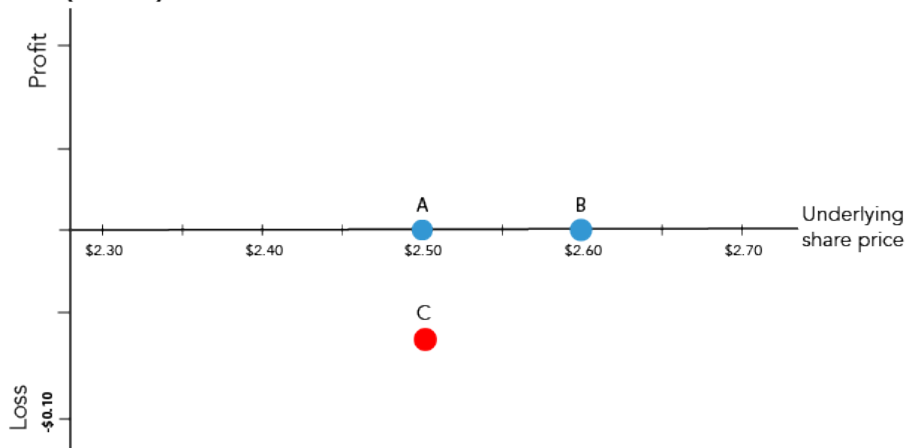
Next, using the value of the premium (\$0.10) you can determine the break-even point. As we discussed earlier the break-even point for a call option is the strike price plus the premium, therefore  $\$2.50 + \$0.10 = \$2.60$ . Mark this point on the x-axis (B)

### B - (x-axis)

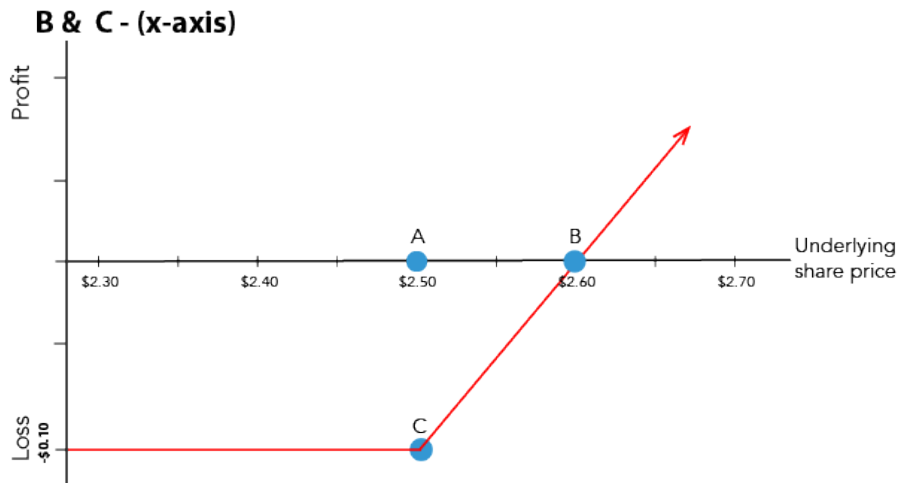


As we know, the premium paid also represents the maximum loss potential for this strategy, so place the third point down from the strike price for a distance that is equivalent to the premium (C)

### C - (x-axis)



Now you have all the points needed to construct the payoff diagram. Draw a horizontal line through point C towards the y-axis. Then run a line that links points B and C.



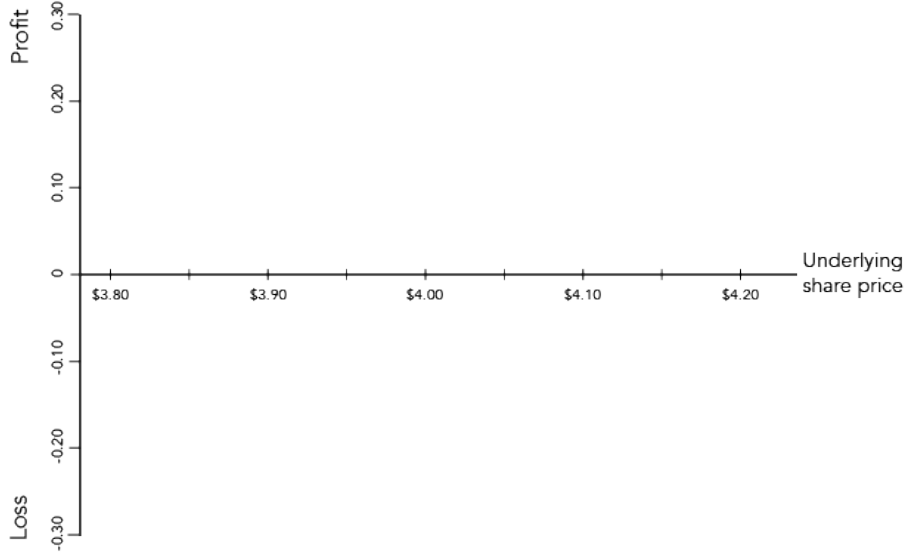
Now you have your payoff diagram for a \$2.50 call option with a \$0.10 premium. Should the underlying share price rise above \$2.60 you make a profit from this strategy, however if the price remains below \$2.60 you make a loss. The maximum loss you can incur is limited to the value of the premium; therefore the loss line is flat.

**Example two**

See if you can construct your own payoff diagram using the information provided:

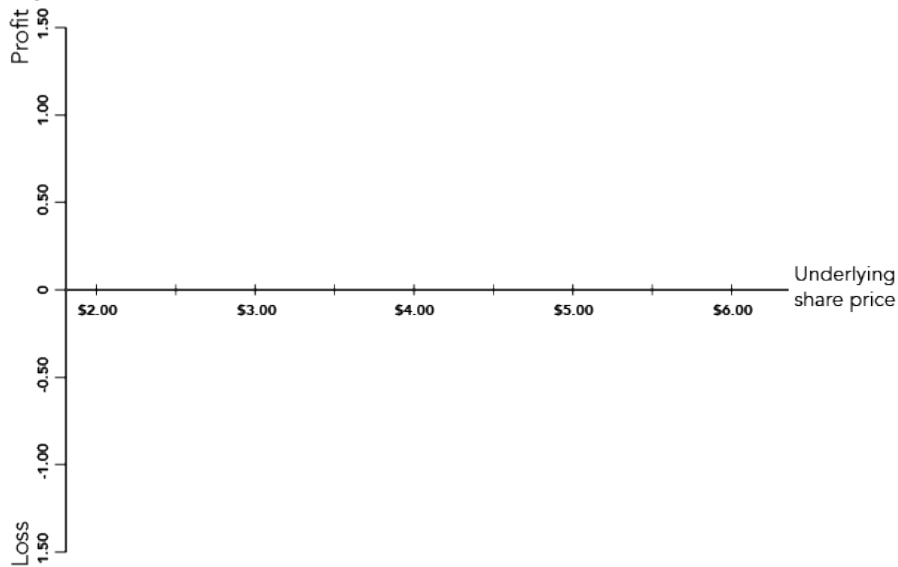
A. Draw a payoff diagram for a long call. The strike price is \$4.00 and the premium is \$0.10.

**Payoff A**

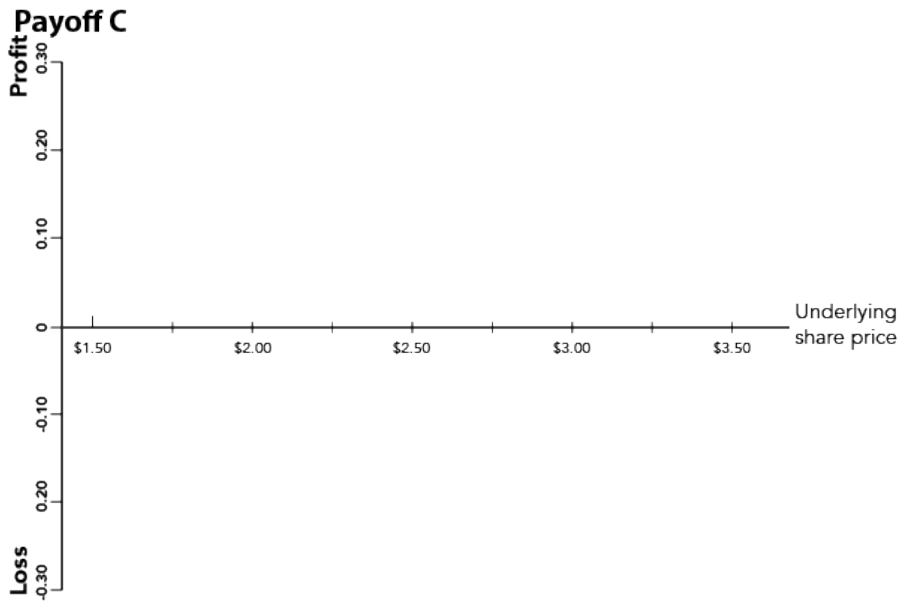


B. Draw a short \$4.00 call paying a premium of \$1.00.

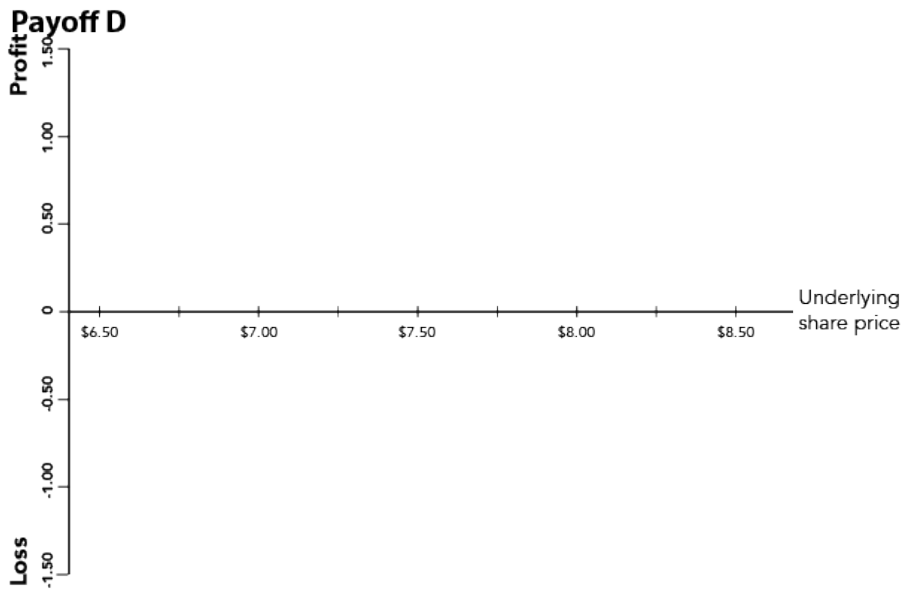
**Payoff B**



C. Draw a short \$8.00 put paying a premium of \$0.75.



D. Draw a long \$2.75 put paying a premium of \$0.25.





# Trading strategies

Now that you understand the four basic trading choices and their payoff diagrams, let's look at some examples of these in use under various market conditions:

## **EXAMPLE 1: INCOME ENHANCING IN A FLAT MARKET**

If the share market is experiencing a period of low volatility (the market is flat and prices are neither rising nor falling), writing call options can be an effective strategy to generate income over shares you own.

By writing call options you collect a premium. Should the underlying share price remain flat then the option contract will expire worthless and you get to keep the premium. The premium collected effectively acts as income from your asset (the underlying shares).

### **How it works:**

It is June and you own 10,000 ABC shares currently worth \$4.00 per share, (total value of \$40,000). You decide to write 100 \$4.25 OTM Sept call options paying a premium of \$0.22.

In doing so you collect a premium of \$2,200 ( $\$0.22 \text{ premium} \times 100 \text{ contracts} \times 100 \text{ shares per contract}$ ).

The option buyer has the right to exercise the contract to buy your ABC shares at any time prior to expiry, however would only likely exercise their rights if the option became in the money for them. In this example, the option is ITM for the buyer if the share price rises above \$4.25 (being the strike price), however the break-even point for the buyer is equal to the strike price + the premium, \$4.47.

If the share price remains flat over the next three months then the options contracts will expire worthless, the buyer will no longer have the right to purchase your shares and you get to keep the premium. Under this scenario you have generated \$2,200 of additional income on your asset during a period in which the share price has not move, or moved very little.

The risk: if the share price rises by more than \$0.25 then the option buyer may exercise their rights to buy the ABC shares from you.

In this instance you will sell your shares for \$4.25 per share, plus you collected a premium of \$0.22 per share, therefore representing an effective sale price of \$4.47 per share (or \$44,700). While this sale price is 11.75% above the price of your shares back in June, you are missing out on any further potential gains if you still owned the shares.

In the example above, you benefit in the event that the share price falls, remains flat or rises by a small amount. Should the share price rise significantly you will still benefit from this gain by a small amount however your maximum potential gain is limited to the value of the premium.

## **QUIZ 5**

It is mid-September and you hold 4,780 JKL shares that are currently trading at \$3.10 per share. Through discussions with your broker you form the opinion that the market is going to be flat for the next few months leading up to Christmas and the broker recommends you consider an income enhancing strategy achieved by selling call options.

The quotes for December JKL call options are as follows:

1. Assuming you decide to proceed with an income enhancing strategy, how many call options could you write based on the number of shares you hold? \_\_\_\_\_

2. What is the current bid price for an ATM call? \_\_\_\_\_

3. How many options could you sell at this price? \_\_\_\_\_

4. You decide to write 20 \$3.20 call options at \$0.12.

a. What is the total value of the premium be that you will receive?

\_\_\_\_\_

b. What is the break-even point for the buyer (taker) of the option contract?

\_\_\_\_\_

5. The company (JKL) announces the sudden resignation of its CEO and CFO. The departure of two of its executives raises concern over the company's future and the share price falls significantly. You wish to exit your option position and also sell your JKL shares. What choices do you have to exit your option position?

\_\_\_\_\_

6. You decide to buy back your option contracts for a premium of \$0.005. Identify your total profit/loss achieved from this strategy and explain why this strategy has (or hasn't) been effective for you. Profit/loss:

\_\_\_\_\_

## **EXAMPLE 2: PROTECTING YOUR INVESTMENT IN A FALLING MARKET**

Option contracts can be used as a form of insurance in the same way you would insure your house in case of a fire. If you hold a basket of shares you may decide to consider some insurance to protect against the risk of falling share prices. Buying put options is an effective way of achieving this. By purchasing a put option you pay a premium, much like insurance on a house. Should the share price fall you would exercise the put option and sell your shares at the strike price. The higher the strike price, the greater sale price you achieve when selling the shares, however the more expensive the premium will be - much like insurance on your house, the more protection you are after, the more expensive the insurance premium will be.

### **How it works:**

You own 5,000 BCD shares currently worth \$6.00 per share (total value = \$30,000). You are concerned that the market may be heading downward and therefore want some protection on your investment.

You decide to purchase 50 \$6.00 put options for a premium of \$0.11. (Total cost = \$550). The break-even point of this strategy is \$5.89 (\$6.00 strike price less \$0.11 premium paid).

Should the price of BCD shares fall below \$5.89 your options contract has value and therefore you could exercise it and sell your shares at the strike price of \$6.00 per share (total value = \$30,000).

If the value of the shares remains the same or increases, then you wouldn't exercise the option contracts and let these expire.

An individual using this strategy should remember that the strategy is about protection. When buying the premium you should not consider the value of the premium as an amount you could potentially lose, rather this is the cost for protection.

The up side of this strategy is that you still gain from rising prices. So in effect you are setting a floor price (minimum selling price) for your assets being the strike price less the premium paid.

The floor price is calculated as:  $\text{Floor Price} = \text{Strike Price} - \text{Premium Paid}$

## QUIZ 6

You are looking to set a floor price on EFG shares you own that are currently trading at \$2.50 per share. Your broker gives you the following quote sheet for put options, what is the highest floor price you can set by using a long put strategy?

Strike price	Bid price	Ask price
\$2.25	0.275	0.290
\$2.50	0.525	0.550
\$2.75	0.765	0.770
\$3.00	0.990	0.995

Floor Price = \_\_\_\_\_

What is the maximum loss potential of a long put strategy?

\_\_\_\_\_

3. What is the break-even point for a long put option if the strike price is \$11.75 and the premium is \$0.89? \_\_\_\_\_

4. Assume you purchased an OTM \$2.75 put option for \$0.25. The share price moves so that the contract now has \$0.25 of intrinsic value and \$0.22 of time value.

a. What are your options to exit this position? \_\_\_\_\_

b. A broker has offered to buy the put from you for \$0.51. Is this a good deal? Briefly justify your answer.

\_\_\_\_\_

c. Assume you take the deal from your broker and sell the put for \$0.51. What obligations do you now have as a result of this action?

\_\_\_\_\_

## EXAMPLE 3: ENHANCING RETURNS IN A RISING MARKET

This strategy is all about providing investors with a different method of profiting from a bull market rather than simple buying shares in a company. *(Unless otherwise stated, all examples exclude brokerage fees).*

In the example below I will set a scenario and outline four different strategies that could be used and the likely returns/benefits of each strategy.

Scenario - You own 1,000 FGH shares that are currently trading at \$15.00 per share (value of your portfolio = \$15,000). You have been researching the FGH Company and form the opinion that the share price is going to significantly rise over the next 6 months due to some favourable upcoming contracts. You have \$5,000 in idle cash sitting in a savings account earning simple interest of 4% p.a. and are unsure if you should buy more FGH shares. Your broker outlines the following strategies for you to consider:

1. Do nothing – you stand to profit from your existing holding in FGH and the idle cash will return 4% p.a. over the six-month period.
2. Buy more shares – invest your idle cash in FGH shares and benefit from the potential price rise.
3. Write put options – collecting the premium from put options and leveraging your idle cash. Should the share price increase the option contracts value will decrease and eventually expire worthless. As the value decreases you can offset this position and collect the profit being the difference between the purchase and sale price of the premium, or you could let the contract expire worthless and collect the full value of the premium.
4. Buy call options – while you pay a premium you stand to gain should the share price rise. If the option were to become ITM you can exit the position and collect the difference between the purchase and sale price of the premium, or you could exercise the option contract and buy the underlying shares at the strike price

## QUIZ 7

Use the information above to assist you in answering the following questions:

1. What are the risks associated with using strategy d) Buy call options?
  - a. The contract expires worthless
  - b. The contract gains value but is still OTM and you cannot offset your position
  - c. The contract expires ITM however you do not have the funds to exercise the contract
  - d. All of the above
2. Assuming you use strategy a) Do nothing, What will the value of your cash and share portfolio be after six-months if the MNO shares rise by \$1.50?

New share portfolio value = \_\_\_\_\_

New cash savings value =  $\$5,000 \times (1 + 4\% \times 1/2) = \$5,100$

Total portfolio value = \_\_\_\_\_

With reference to option b) Buy more shares, why might some relate this to the common saying “never put all your eggs in one basket”? \_\_\_\_\_

\_\_\_\_\_

If you chose option c) Write put options, and wrote 3 put options for a premium of \$1.00, are you covered or naked? \_\_\_\_\_

\_\_\_\_\_

## Expected Outcomes

Option a). Do nothing – you stand to make a return on your cash savings plus, should any gains in the share price. The main downside is that if the share price rises by more than the interest rate value, you miss out on the full potential gain. The following highlights your expected return after 6 months:

**Share price rise by 10%:** +\$1,600 (8%)  
**Share price doesn't move:** +\$100 (0.5%)  
**Share price falls by 10%:** -\$1,400 (-7%)

Option b). Buy more shares – at the current price of \$15 you buy 330 more shares (the remaining cash is used to pay brokerage fees). While you stand to make more if prices rise, you also run the risk of your portfolio falling in value by more if the share price falls.

**Share price rise by 10%:** +\$1,995 (+10%)  
**Share price doesn't move:** no change  
**Share price falls by 10%:** -\$1,995 (-10%)

Option c). Write put options – you write 10 at-the-money put options and received a premium of \$1.25 per share. This amounts to a total premium of \$1,250 (assume no interest is earned on this money). If the share price rises, the put option will expire worthless and you keep the premium, plus you still gain interest on your cash savings. If the share price were to fall however, the put options can be exercised and you would be obligated to buy 1,000 shares for \$15 per share.

**Share price rise by 10%:** +\$2,850 (14.25%)  
**Share price doesn't move:** +\$1,350 (6.75%)  
**Share price falls by 10%:** -\$1,650 (-8.25%)<sup>1</sup>

Option d). Buy call options – assuming at-the-money call options were currently worth \$0.50, you could purchase 100 call options for \$5,000. If the share price falls or doesn't move the maximum loss you would incur is \$5,000 (the premium). If the price rose however, you could stand to make a significant amount of money as you are leveraged. The following information summarises your expected return using this strategy.

**Share price rise by 10%:** +\$11,500 (57.50%)<sup>2</sup>  
**Share price doesn't move:** -\$5,000 (-25%)  
**Share price falls by 10%:** -\$6,500 (-32.50%)

## Other common trading strategies

**Covered Call** – buying shares and immediately selling call options (also known as a buy-write strategy) to generate additional income in a neutral market over short periods of time.

**Married Put** – buying shares and immediately buying put options establishing a protective relationship and is beneficial when you are bullish on the underlying share price while also limiting downside losses.

<sup>1</sup> When the share price fell by 10% the put option became in the money and is exercised. In this instance you would need to sell your existing shares at \$13.50 per share (10% fall) to be able to fulfil your obligation in buying 1,000 shares at \$15.00. Your original existing holding realised a loss of \$1,500. You then realised another loss of \$1,500 when you purchased the new 1,000. The premium received and interest earned offset a portion of your loss.

<sup>2</sup> As the share price rose 10% (\$1.50) you would expect that the option premium would increase by the same amount, over the period however, the time value would decay to zero, so for the purpose of this example we're assuming you can achieve a sell price for your option contracts of \$1.50.

**Bare Put Spread** – buy a put option and sell a put option with a lower strike price creates an alternative strategy to short selling. The strategy provides profit potential in a falling market while limiting loss potential in a rising market.

**Long Butterfly** – buy a put option, sell two call options with a higher strike price and buy another put option with an even higher strike price. This strategy sets a profit trap in the event of the underlying share price moving only a little or not at all, while also providing limited loss potential should the share price rise or fall significantly.

# Glossary

## Arbitrage

A type of trader that seeks to make risk free profits by picking up on price discrepancies between multiple options contracts and/or the underlying shares.

## American style option

Option contracts may be exercised by the holder at any time leading up to the expiration date

## At-the-money (ATM)

When the strike price of an option is equal to the spot price of the underlying shares.

## Bearish

Someone who thinks prices will fall.

## Broker

Someone who buys or sells assets (such as shares or options) on behalf of someone else.

## Bullish

Someone who thinks prices will rise.

## Call

A type of options contract in which the buyer has the right, but not the obligation, to buy underlying shares at a predetermined price, while the seller has the obligation to sell the underlying shares to the buyer should they exercise that right.

## Central Counterparty (CCP)

A clearing model in which a single entity (NZ Clearing Corporation Limited) replaces trade counterparties and becomes the buyer to each seller and the seller to each buyer therefore assuming counterparty risk for its participants.

## Covered call

When someone writes call options while also owning the underlying asset e.g. shares to generate revenue

A contract traded by someone who owns the underlying asset e.g. shares.

## Derivative

A contract in which its value is based on, or derives from, the value of something else.

## European style option

Option contracts may only be exercised on the expiration date.

## Exercise/strike price

The price at which the underlying security can be purchased (call option) or sold (put option).

## Expire

Option contracts are listed for a certain amount of time. At the end of this period the contract will come to an end. If you had purchased a call or a put option and it expires, then you will no longer hold the rights to exercise the option contract.

## Expiry date

The last day in which the contracts can be bought or sold and also the last day in which holders of option contracts can exercise their right contained in the option contract.

## Futures contract

A legally binding agreement between a buyer and a seller to buy or sell a commodity or asset at a set date in the future, for a predetermined price.

## Hedger

A type of trader that has an interest in the underlying shares and is seeking to mitigate risk by creating price certainty, it is likely that they own shares or are anticipating buying shares.

## In-the-money (ITM)

An ITM call option is when the spot price is greater than the strike price. An ITM put option is when the spot price is less than the strike price. ITM refers to when options have intrinsic value.

## Initial margin

The requirement for option writers to deposit a form of collateral (such as shares or cash) to the Clearing House to provide certainty that they can fulfil their obligations contained in the option contract.

## Intrinsic value

The difference between the strike price and the underlying's spot price.

A call option has intrinsic value if the spot price is greater than the strike price, while a put option has intrinsic value if the spot price is less than the strike price.

### **Long**

Buying an option contract. If someone is to go long on an option contract, they are buying an option.

### **Naked**

A contract traded or position taken on by someone who does not own the underlying shares.

### **Offset**

Making the opposite transaction to the one taken to enter into the position. For example, selling the option contract previously purchased, or buying the option contract previously sold.

### **Option**

A contract based on the trading of rights. The buyer of an option contract is purchasing the seller's rights to either buy or sell certain shares at, or before a specific date for a predetermined price.

### **Out-of-the-money (OTM)**

An OTM call option is when the spot price is less than the strike price. An OTM put option is when the spot price is greater than the strike price.

### **Premium**

The premium is the cost, or the price of the option.

### **Put**

A type of options contract in which the buyer has the right, but not the obligation, to sell underlying shares at a predetermined price, while the seller has the obligation to buy the underlying shares from the option buyer should they exercise that right.

### **Shares**

A unit representing ownership in a portion of a company. Shares provide the right to profits made up that company and also the right to vote on matters related to that company.

### **Short**

Sell an option contract. If someone were to hold a short position, they have sold an option contract.

### **Speculator**

A type of trader that does not have a direct interest in the underlying market and rather trade option contracts in the attempt to profit by predicting market movements.

### **Spot price**

The current share price of the underlying shares linked to the option contract.

### **Strike price**

The strike price (or exercise price) is the agreed price at which the underlying shares will change ownership if the option is exercised.

### **Taker**

The buyer of an option.

### **Time value**

A component of the premium. As all option contracts have an expiry date, the amount of time before the contract expires can impact the price paid for the option.

### **Underlying**

Refers to the shares that the option contract relates to. All equity option contracts are linked to underlying shares. Call options represent the right (but not the obligation) to buy these shares, while put options represent the right (but not the obligation) to sell these underlying shares.

### **Writer**

The seller of an option.



# Answers

## QUIZ 1

1. **b)** – a derivative contract is a contract in which its value is based on, or derives from, something else.
2. **d)** – the global development of the derivatives industry is due in part to enhancements in technology and communications, ease and increase of cross-border trade and an increasingly volatile environment.
3. **c)** – the core purpose of NZX is to operate and regulate the securities and derivatives markets in New Zealand.

## QUIZ 2

1.

	SPK Feb 2.75 put	FBU Jun 7.00 call
Type	Put	Call
Underlying	SPK shares	FBU shares
Strike price	\$2.75	\$7.00
Expiry date	February	June

2. **d)** – a put option seller receives a premium and has the obligation to buy shares should the contract be exercised.
3. **a)** – a call option buyer pays a premium and has the right to buy shares from the seller.
4. **c)** – a call option seller receives a premium and has the obligation to sell shares should the option contract be exercised.
5. **b)** – a put option buyer pays a premium and has the right to sell shares should they chose to exercise the contract.
6. **d)** – option contracts are listed for up to 18 months.

## QUIZ 3

1.
  - a. Intrinsic value = **\$0.90**
  - b. Intrinsic value = **\$0.00**
  - c. Intrinsic value = **\$0.45**
  - d. Intrinsic value = **\$5.75**
2.
  - a. Time value = **\$0.05**
  - b. Time value = **\$0.22**
  - c. Time value = **\$0.62**
  - d. Spot price = **\$4.37**
- 3.

Strike/option type	Spot price	ITM/OTM/ATM
\$10.00 call option	\$10.00	ATM
\$500 call option	\$502.50	ITM
\$3.75 call option	\$3.00	OTM
\$6.00 put option	\$6.20	OTM
\$12.50 put option	\$12.50	ATM

4. **Increases** – the more volatile an underlying asset is, the higher the premium will be generally speaking.

#### QUIZ 4

1. **Speculator** – option contracts are a simple and cost effective way for someone to take a view on and attempt to make a profit from correctly predicting price movements (either upward or downward). These types of users are categorised as speculators.
2. **f)** – the holder of a call option that is in the money can choose to sell back the option, exercise the option or let the option expire.
3. **e)** – a writer of a call option can close out their position by either buying the contract back or letting the contract expire.
4. **c)** – should an option contract expire in the money the contracts automatically exercise and initiate a transaction to buy or sell underlying shares.
5. **e)** – should a call option be exercised and the writer does not own the underlying shares they must buy the underlying shares in the share market in order to sell them to the option holder and fulfil their obligations contained in the call option contract. As option contracts are only exercised when they are in the money, the writer will likely have to purchase the shares for a price higher than the agreed sell price (strike price), therefore losing money.
6. **d)** – the price paid for option contracts (the premium) is determined by a number of factors. The two main components of the premium are the time value and the intrinsic value.

#### QUIZ 5

1. **47** – as you hold 4,780 shares and one option contract contains the right to buy or sell 100 shares, then the maximum number of contracts you can write over your holding is  $4,780/100 = 47.8 \hat{=} 47$  contracts.
2. **\$0.21** – the ATM call option has a bid price of \$0.21
3. **50** – the bid volume represents the total number of option contracts available at the best bid price. In this case you could sell 50 contracts at a price of per share \$0.21.
4. a). **\$240** – you will receive  $\$0.12 \times 100 \text{ shares per option contract} \times 20 \text{ contracts} = \$240$ .  
b). **\$3.32** – the break-even point for a call option is equal to the strike price plus the premium.
5. **Buy 20 call options (offset) or let the contracts expire worthless (expire).**
6. **\$230** – buy price for 20 option contracts =  $\$0.005 \times 100 \text{ shares per contract} \times 20 \text{ contracts} = \$10$ .  
Sell price for option contracts =  $\$0.12 \times 100 \text{ shares} \times 20 \text{ contracts} = \$240$ . Sell price less buy price = \$230. This strategy has proven useful, as it has generated \$230 of income that is not otherwise achievable using a more standard buy/sell shares strategy.

**QUIZ 6**

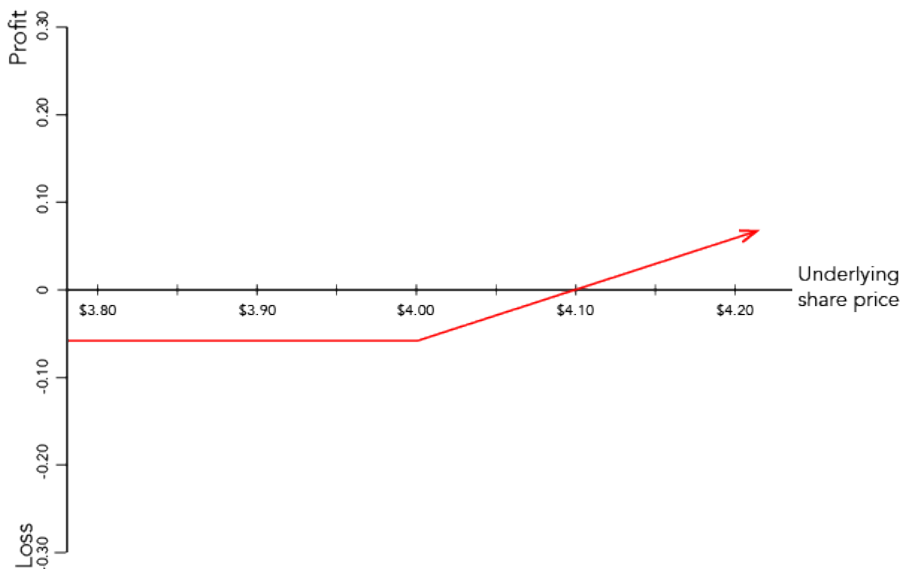
1. **\$2.005** – buying a put option with a \$3.00 strike will cost a premium of \$0.995, therefore setting a floor price of \$2.005.
2. **The maximum loss of a long put strategy is limited the value of the premium paid for the put option.**
3. **\$10.86** – the break-even point for a put option is equal to the strike price less the premium paid.
4. a) **Offset, Exercise, Expire**  
 b) **Yes** – the contract has intrinsic value of 25 cents and a time value of 22 cents, therefore representing a total premium value of 47 cents. In selling the option for 51 cents you are selling at a 4-cent premium above the fair value of the contract.  
 c). **None** – you have now offset your position and no longer hold any obligations.

**QUIZ 7**

1. **d)** – all of the above (the contract expires worthless, you are unable to offset your position and the contract expires in the money however your funds fall short so you cannot acquire the shares).
2. New share portfolio value =  $\$16.50 \times 1,000 = \mathbf{\$16,500}$   
 New cash savings value =  $\$5,000 @ 4\% \text{ p.a.} = \mathbf{\$5,100}$   
 Total portfolio value =  $\mathbf{\$16,500 + \$5,100 = \$21,600}$

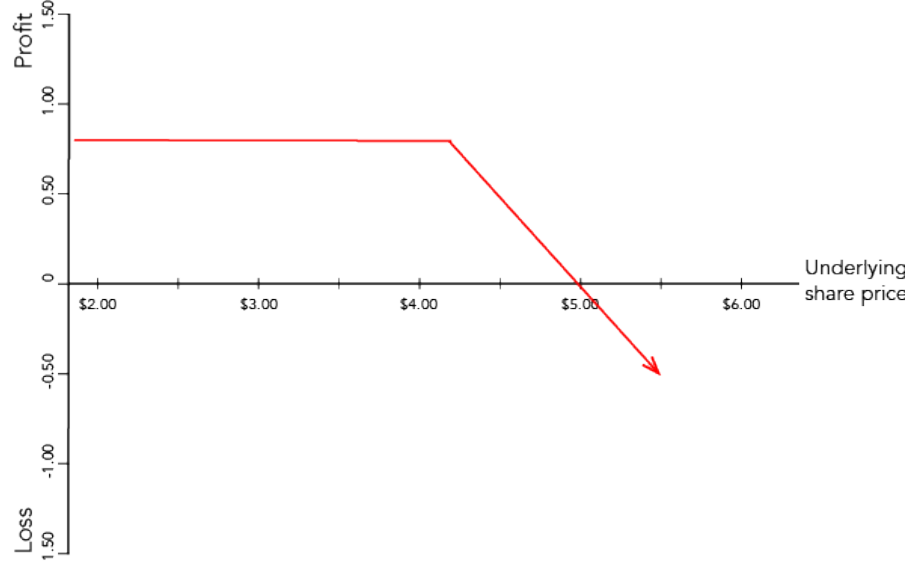
**PAYOFF DIAGRAMS**

Draw a payoff diagram for a long call. The strike price is \$4.00 and the premium is \$0.10.

**Payoff A**

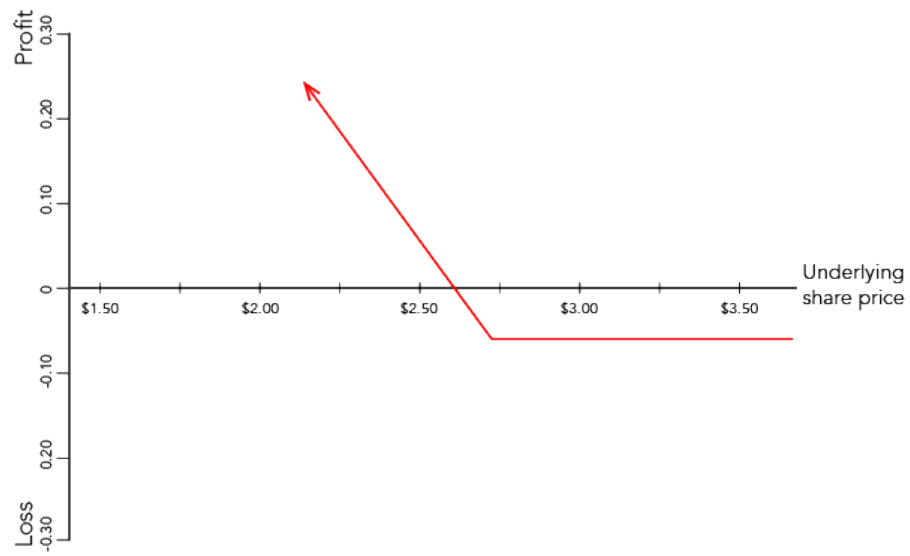
Draw a short \$4.00 call paying a premium of \$1.00

### Payoff B

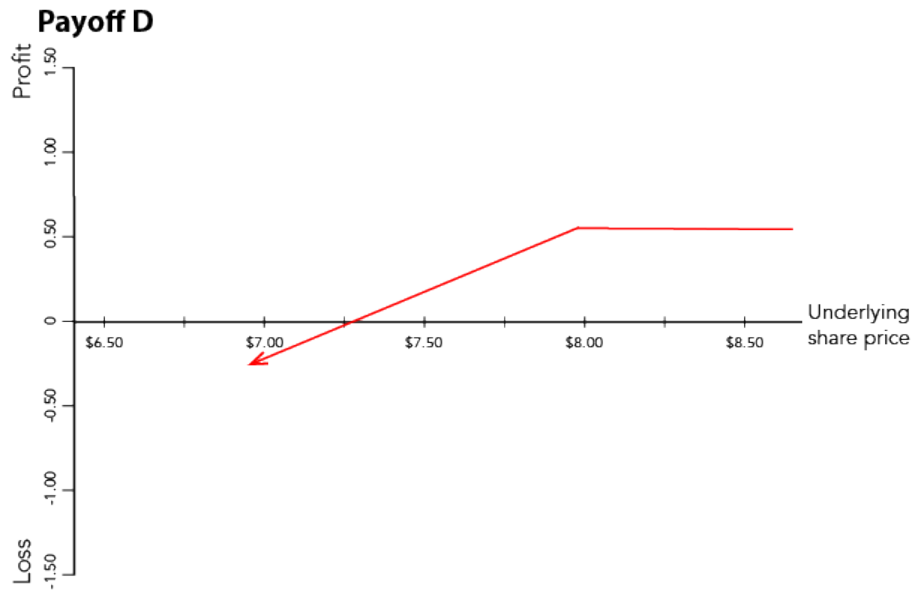


Draw a long \$2.75 put paying a premium of \$0.25

### Payoff C



Draw a short \$8.00 put paying a premium of \$0.75



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