

Margins



ASX
AUSTRALIAN STOCK EXCHANGE

Contents

Before you begin	2
What are margins?	3
When are margins paid?	3
Written calls and puts	3
LEPOs	4
How can margins be met?	5
Cash	5
Collateral	5
How are margins calculated?	7
Calculating the premium margin	7
Calculating the risk margin	8
Calculating the total margin	10
How are margins calculated for a portfolio?	11
A single security portfolio	11
Risk margin calculations for single security portfolios	11
Premium margin calculations for single security portfolios	12
Total margin payable for single security portfolios	12
A multiple security portfolio	13
How can LEPO margins be met?	17
How are LEPO margins calculated?	18
Calculating the risk margin	18
Calculation of the premium margin	18
Glossary of terms	22
Further information	24

Before you begin

This booklet explains how Options Clearing House Pty Ltd (OCH) calculates margins for options traded on ASX's options market. You should note that brokers' margins may be different from OCH. (This is explained further on page 5).

Simply stated, margins serve to protect the integrity of ASX's options market. As not all options transactions involve margin payments this booklet explains when they are required, how they are calculated and what collateral OCH will accept to cover margin obligations.

This booklet assumes that you have a basic understanding of the workings of ASX's options market. You may also find Understanding Options Trading and the LEPO Explanatory Booklet helpful.

Copies can be obtained free from our website at asx.com.au, by contacting ASX Derivatives Division or from your broker.

Throughout this booklet examples are used to explain how the margining system works. All examples assume an option contract size of 1,000 shares, and for simplicity of explanation, ignore exchange fees or commissions that may also be payable. The terminology associated with margins is explained in the Glossary of Terms on page 20.

What are margins?

Definition: a margin is the amount calculated by the Options Clearing House (OCH) as necessary to cover the risk of financial loss on an options contract due to an adverse market movement.

Simply put, the minimum level of cover required to cover margin obligations is the liquidation value of your option contracts.

When are margins paid?

If you only buy options, then margins are not payable. It is when you write options that margins may be payable.

Margins are paid to cover your obligations to your broker. Brokers in turn pay these margins to OCH. OCH recalculates margins at the end of each day to ensure an adequate level of margin cover is maintained. OCH then debits or credits your account with your broker according to whether your margin obligation has increased or decreased. Where there is a shortfall in your account you will usually be required to pay margins within 24 hours. When an obligation to the market no longer exists, all margin amounts are credited back to your account with your broker.

For example, the writer of a call option would be required to add to their margin cover if the share price moved up from its current level. This is because the writer has a larger potential obligation under the option contract and may need to buy shares in order to deliver them at the exercise price. If the share price falls, the writer's margin obligations would be reduced.

Potential obligations arise from:

- written call option contracts;
- written put option contracts; and
- both taken and written LEPO positions.

Please note that margin obligations apply to these situations in isolation. If you establish certain types of option strategies, the margin obligations may be reduced because some positions may offset other positions. Margin offsets are discussed on page 9.

Written calls and puts

Option writers have a potential obligation to the market because the taker of the option may decide to exercise their position.

Call options

For example, say you are the writer of a Boral Ltd (BLD) November \$4.00 call option and the BLD share price is \$4.10. In writing the position you receive the option premium and have an obligation to sell 1,000 BLD shares at \$4.00 per share if the taker of the option exercises their right. If the market rises, your written call option could be exercised. If this happens you would have to sell 1,000 BLD shares to the taker at \$4.00 each. If you did not already own these shares you would have to buy them at the current market price but deliver them to the taker for \$4.00, possibly incurring a loss.

The primary objective of requiring margin cover is to ensure that options positions can be liquidated (closed out) and the obligation removed.

On the other hand, if you are the taker of a BLD \$4.00 call option you would not be required to meet any margins. This is because you have no obligation to buy the BLD shares. In buying the option you would have already paid a premium to the writer for the right to buy the BLD shares. This premium represents your total outlay unless you decide to exercise your option, in which case you would be required to buy the 1,000 BLD shares at the exercise price of \$4.00. Normally you would only want to do so if the market price was above \$4.00 at the time you decide to exercise.

Put options

Like the writer of a call option, the writer of a put option also has a potential obligation if the taker of the put decides to exercise their right to sell the underlying securities.

For example, say you are the writer of a Woolworths (WOW) October \$5.00 put option, you have the obligation to buy 1,000 WOW shares at \$5.00 if the taker exercises their right to sell. In return for taking on the obligation to buy 1,000 WOW shares at \$5.00, you will receive the option premium. In our example, the option premium is \$0.16 per share or \$160 (16 cents x 1,000 shares per contract) per WOW contract. To ensure you can meet your potential obligations you will be required to lodge margin cover. On the other hand, if you are the taker of a WOW October \$5.00 put option you will have to pay the premium of \$160 to the writer. As the taker you have the right to sell the WOW shares at \$5.00.

In summary, writers of call and put options are required to lodge margin cover because of their obligations which arise from writing options.

LEPOs

When you buy an ordinary exchange traded option you are required to pay the entire option premium up front. However, when you buy a LEPO, the initial amount you pay is only a small fraction of the full premium. Therefore OCH requires the taker as well as the writer of a LEPO to lodge margin cover. Takers of LEPOs are margined because they have an outstanding obligation to pay the balance of the premium to the writer. Writers of LEPOs, like writers of ordinary exchange traded options, may suffer losses if the underlying security rises in value and therefore writers of both LEPOs and ordinary exchange traded options are required to lodge margin cover. A full explanation of the margining process for LEPOs can be found on page 16.

How can margins be met ?

Margin obligations are calculated at the end of trading each day and OCH notifies each broker of the margin obligations for each of that broker's accounts early the next trading day. As the broker is responsible for the margin obligations to OCH, it is the broker who has the legal obligation to settle with OCH. Each broker's total margin obligations must be lodged with OCH by 11.00 am the same day.

To enable the broker to settle their daily margin obligations with OCH the broker will generally ensure that their clients have deposited cash or collateral, such as securities, bank guarantees or Austraclear pledged securities.

Margins from your broker may be different to OCH.

OCH's margining methods calculate the margins required from your broker (Clearing Participant). Your broker's margin requirements for your account may be different to those of OCH if your broker uses a different margining standard to OCH. **The explanations throughout this booklet apply where your broker adopts the same margining as OCH.**

Cash

A broker may require you to provide cash to enable the broker to meet their margin obligations to OCH.

Collateral

In addition to, or as an alternative to cash, you may wish, (subject to your broker and/or OCH agreeing), to provide certain types of collateral. There are three different types of collateral which OCH will accept. These are discussed below.

OCH accepts your collateral as a *third party*, as you are providing it to OCH as security for *your broker's* margin obligations to OCH. Your broker may allow you to provide collateral which is different to what OCH will accept. You should check what collateral your broker will accept. In addition, in the event that your broker's margin obligation is less than the value of collateral which OCH requires at any particular time, your broker may (subject to your instructions) hold on to that surplus or return it to you. You should check what your broker's practices are, as different brokers use different practices.

1. Shares and other ASX traded securities

OCH accepts shares and other securities in a number of entities listed on ASX. For all CHES approved securities these must be held as a Broker Sponsored holding. OCH does not accept Issuer Sponsored holdings or certificates for CHES approved securities. Shares and other ASX securities accepted by OCH as collateral fall into three tiers or categories as follows:

Tier 1: Securities which are currently approved as underlying securities for options trading or securities which are able to meet ASX's criteria for approval as underlying securities but are not currently traded on the options market.

Tier 2 : Ordinary shares in companies in the SETP™ /ASX 50 Index.

Tier 3: ASX traded securities (other than fully paid ordinary shares) of companies whose ordinary shares are eligible as collateral under Tier 1 provided these securities have:-

- an issued capital of a minimum of \$100 million,
- a monthly volume of at least 100,000, and
- a price greater than 50 cents.

An example of acceptable Tier 3 collateral would be the Amcor (AMC) 6.5% unsecured subordinated convertible notes (AMCG). AMC securities are approved under Tier 1, so AMCG convertible notes meet the requirements under Tier 3.

Your broker will be able to advise you whether a particular security falls into one of these Tiers.

It is not necessary to lodge the same securities as the underlying securities to the option contract. For example, it is possible to lodge AMP shares as collateral to meet margin obligations over NCM options.

2. Bank guarantees

OCH accepts bank guarantees as collateral from OCH approved banks. Your broker will be able to advise you which banks are OCH approved banks.

A "haircut" is a reduction in the face value of the security to protect against sudden market movements.

To protect against a sudden fall in the value of collateral held, OCH will value securities at approximately 70% of their current market value. This reduction of approximately 30% is known as a "haircut". The amount of any haircut which OCH will apply may change for various reasons including where a takeover bid for the underlying securities has arisen.

For example, say you lodge 1,125 Newcrest Mining Ltd (NCM) shares as collateral to cover your margin obligations. OCH will determine the current market value of the NCM shares by multiplying the number of shares lodged by the current NCM share price, in this case $1,125 \times \$2.63 = \$2,958.75$. OCH then reduces this amount by the "haircut" of 30% to determine a collateral value of \$2,071.13 (\$2,958.75 less 30%). If your margin obligation exceeds the collateral value after the haircut you will be asked by your broker to provide more NCM shares, other types of acceptable collateral or cash to make up the difference.

3. Austraclear Pledged Securities

OCH also accepts certain money market securities which have been lodged with Austraclear and pledged to OCH. Acceptable securities include:

- bank negotiable certificates of deposit
- bank transferable certificates of deposit
- non-bank promissory notes or certificates of deposit
- bank bills of exchange
- non-bank bills of exchange

How are margins calculated?

The minimum level of cover required to cover margin obligations is equivalent to the liquidation value of your option contracts.

For example, if the market value of an option contract is \$0.38, the writer would be required to lodge at least \$380 (\$0.38 x 1,000 shares per contract) as margin cover. However, this does not take into consideration the possibility of inter-day price movements. In reality, OCH calculates margins using a sophisticated system known as TIMS (which stands for the Theoretical Intermarket Margining System).

TIMS takes into account the volatility of the underlying security when calculating your margin obligations. Volatility refers to the size and frequency of price fluctuations.

Generally only one margin call is made each day. However, if the market moves strongly up or down, OCH may call for extra margin cover to be lodged during the day (ie an intra-day margin call) to cover changes in value of the underlying securities.

TIMS arrives at a margin by calculating two margin components for each position: the premium margin and the risk margin. The sum of these is the total margin.

Calculating the premium margin

The premium margin is the market value of the particular position at the close of business each day. For example, if an option is valued at \$0.35 at the close of business on day 1, the premium margin component of the total margin payable the following day would be \$350 per contract. At the end of day 2, if the option is valued at \$0.45 the premium margin component of the total margin payable the following day would be \$450 per contract. At the end of day 3, if the option is valued at \$0.40, the premium margin component of the total margin payable the following day would be \$400 per contract.

This is summarised in the table below:

	Day			
	1	2	3	4
Option market value	\$0.35	\$0.45	\$0.40	\$0.36
Market value per contract	\$350	\$450	\$400	\$360
Premium margin	\$350	\$450	\$400	\$360

PREMIUM MARGIN + RISK MARGIN = TOTAL MARGIN

For a call option writer, the worst case scenario would arise if the market rose...for the put option writer, the worst case scenario would arise if the market fell.

Calculating the risk margin

The risk margin covers the potential change in the price of the option contract assuming the maximum probable inter-day movement in the price of the underlying security.

To calculate this component of the margin TIMS firstly uses the volatility figure for the underlying security to determine the maximum probable daily price movement for each underlying security. This is known as the margin interval and is expressed as a percentage of the current price.

For example, assume Telstra has a current share price of \$7.96. Based on an analysis of the price of Telstra shares over recent times, TIMS determines that the maximum probable interday move that could reasonably be expected from Telstra shares is 6%. In other

words, TIMS estimates that the Telstra share price could fall as low as \$7.48 (\$7.96 minus 6%) or rise as high as \$8.44 (\$7.96 plus 6%), but it is unlikely to be outside this range. In a steady market a margin interval of 7% is about average for securities over which options are traded. It can be much higher in a volatile market or if specific conditions affecting the company, such as a takeover bid, cause increased volatility in the share price.

The margin intervals for all classes of options are usually reviewed each week to ensure they remain appropriate. Once the margin interval for a particular class of options has been determined, TIMS uses the range set by the margin interval to determine the price movement in the underlying security which would cause the maximum loss to your option position.

The table below highlights the worst case scenario for a writer of a call or a put option:

Market movement	Call option writer	Put option writer
If the market rises	Loses because call options increase in value in a rising market	Benefits because put options lose value in a rising market
If the market falls	Benefits because call options decrease in value in a falling market	Loses because put options increase in value in a falling market

Using our Telstra example, TIMS would determine where your Telstra option position has the greatest loss, that is at \$7.48, \$8.44 or possibly even somewhere between these points. The share price at this "worst case scenario" is then used to calculate the theoretical value for your option position. The risk margin is the difference between this theoretical option price and the current option price.

For a call option writer, the worst case scenario would arise if the market rose. Therefore TIMS calculates the theoretical option price of the position (or positions) held by the call writer assuming the underlying security rises by the maximum probable inter day amount. However for the put option writer, the worst case scenario would arise if the market fell. Therefore TIMS calculates the theoretical option price of the position (or positions) held by the put writer assuming the underlying security falls by the maximum probable inter-day amount.

Only writers of exchange traded options have obligations under the option contract, so they face a greater potential loss than an option taker. If there is an adverse market movement the taker of the contract can only lose their option premium.

As a result TIMS calculates movements in the underlying security which would adversely affect an option writer. That is, TIMS determines the writer's worst case scenario.

Using the Telstra example to explain this, assume the Telstra share price is now \$7.96 and you are the writer of a Telstra Nov \$8.00 call worth \$0.35. At the end of each day TIMS calculates the worst case theoretical option price for a Telstra Nov \$8.00 call. In this

example it does this by assuming an increase in the share price of Telstra to \$8.44 (\$7.96 plus 6%). It then uses the \$8.44 theoretical share price to calculate a theoretical option price of \$0.65. The risk margin is therefore \$0.30, that is the theoretical option price (\$0.65) less the current option price (\$0.35).

If you had written a Telstra Nov \$7.50 put option, TIMS would calculate the theoretical option price for this example by assuming a decrease in the Telstra share price by the margin interval to \$7.48 (\$7.96 less 6%). Your risk margin would be the difference between the current market value of the put option with the shares at \$7.96 and the theoretical value of the option if the shares were at \$7.48, that is \$0.07 (\$0.32 less \$0.25).

The premium margin protects the current value of the option, while the risk margin protects against possible losses in the future.

See the table below for a further explanation. Calculations are based on a Telstra share price at the close of business of \$7.96 and a margin interval of 6%.

	Sold Telstra Nov \$8.00 call	Sold Telstra Nov \$7.50 put
Market value at the close of business	\$0.35	\$0.25
Theoretical market value if the share price (worst case) rose 6% to \$8.44	\$0.65	\$0.06
Theoretical market value if the share price (worst case) fell 6% to \$7.48	\$0.16	\$0.32
Risk margin	$\$0.65 - \$0.35 = \$0.30$	$\$0.32 - \$0.25 = \$0.07$

This demonstrates how TIMS analyses daily price movements in the underlying security and calculates the worst case scenario for all

written positions. This process is repeated at the close of business each day until the position either expires, is exercised or is closed out.

Calculating the total margin

The total margin is the sum of the risk margin and the premium margin for a particular position. Following on from the previous example, if the premium margin (which is the same as the current liquidation value) for the Telstra Nov \$8.00 call is \$0.35 and the risk margin is \$0.30 then the total margin is \$0.65. If the premium margin for the Telstra Nov \$7.50 put is \$0.25 and the risk margin is \$0.07 then the total margin is \$0.32.

You may have noticed that in the above examples the total margin payable is the same as the theoretical price of the option contract calculated by assuming the price of the underlying security has risen or fallen by the maximum probable daily price movement to give the worst case scenario.

There are various reasons why OCH separately calculates a risk margin and a premium margin. The risk margin protects against losses due to possible movements in the price of the underlying security while the premium margin represents the current liquidation value of the option.

Offsets

Offsets serve to reduce the amount of total margin payable by giving a portion of credit to "offset" debit positions. Offsets are available for margin payments in all options, including index options, which are within a multisecurity portfolio. The way offsets work is explained in more detail on page 10.

RISK MARGIN + PREMIUM MARGIN = TOTAL MARGIN

How are margins calculated for a portfolio?

If you have a number of options registered in their account TIMS will evaluate the risk associated with their entire options portfolio and calculate total margin obligations accordingly.

A single security portfolio

TIMS calculates your margin obligations for all options in one class together. For example, assume you only have options over the AMP which has a current share price of \$16.53.

In the account are the following positions	Current market value
Taken 1 x October \$17.00 put	\$1.19
Written 2 x April \$15.50 puts	\$0.77 ea
Written 1 x August \$16.00 call	\$0.64
Written 1 x October \$16.50 call	\$0.49

Risk margin calculations for single security portfolios

Firstly, TIMS calculates the impact of both an increase and a decrease in the value of the underlying security by using the margin interval. That is, if the margin interval for AMP is 5% then TIMS calculates the maximum probable inter-day rise in the AMP share price to be \$17.36 (\$16.53 plus 5%) while the maximum possible inter-day fall is calculated as \$15.70 (\$16.53 less 5%).

Secondly, TIMS calculates the theoretical value of each position in the portfolio using these prices.

Premium margins are offset between classes

This is shown in the table opposite. The 'cr' (credit) symbol indicates the price movement is favourable relative to the current option value. The 'dr' (debit) symbol indicates the movement is unfavourable.

TIMS calculates the risk margin for each position by multiplying the difference between the theoretical value and the current value of the option position by the number of contracts held and the number of underlying securities per option contract. TIMS then adds together the risk margins for each of the different series calculated at the maximum and minimum probable prices for the underlying security. In adding these together TIMS treats favourable underlying price movements as positive and unfavourable underlying price movements as negative.

TIMS then selects the most unfavourable total figure as the risk margin for the portfolio, in this example \$1,170.

Position	Current value (premium)	Theoretical option value with AMP at \$15.70	Risk margin with AMP at \$15.70	Theoretical option value with AMP at \$17.36	Risk margin with AMP at \$17.36
Taken 1 Oct \$17.00 put	\$1.19	\$1.81	\$ 620 cr	\$0.72	\$ 470 dr
Written 2 Apr \$15.50 puts	\$0.77 ea	\$1.13 ea	\$ 720 dr	\$0.49 ea	\$ 560 cr
Written 1 Aug \$16.00 call	\$0.64	\$0.16	\$ 480 cr	\$1.39	\$ 750 dr
Written 1 Oct \$16.50 call	\$0.49	\$0.20	\$ 290 cr	\$1.00	\$ 510 dr
Total			\$670 cr		\$1,170 dr

Premium margin calculations for single security portfolios

As mentioned earlier the premium margin is based on the current market value of the position. Where a portfolio has both long and short positions over the same underlying security the premium margin is calculated by subtracting the market value of the long positions from the market value of the short

positions. In other words, the net premium margin is obtained by subtracting the taken positions from the written positions.

For example, you have one taken AMP option and four written AMP options so the premium margin from the taken position will serve to reduce the premium margins on the written positions as shown in the table below.

Position	Current value	Premium margin*
Taken 1 Oct \$17.00 put	\$1.19	\$ 1,190 cr
Written 2 Apr \$15.50 puts	2 x 77 = \$1.54	\$ 1,540 dr
Written 1 Aug \$16.00 call	\$0.64	\$ 640 dr
Written 1 Oct \$16.50 call	\$0.49	\$ 490 dr
Total		\$1,480 dr*

*For premium margin calculations, bought positions are treated as favourable [ie credits] and sold positions are treated as unfavourable [ie debits]. This is because bought positions will offset the premium margin of sold positions.

In this example the total premium margin would be \$1,480. Note that while a net written position (ie where the end result is unfavourable) is margined, a net taken position (ie where the end result is favourable) is not margined. This is because the value of your bought option contracts is enough to offset the obligations arising from any sold option contracts.

Total margin payable for single security portfolios

Following on with the AMP portfolio example the total margin requirement will be:

Risk margin	\$1,170
Premium margin	\$1,480
Total margin payable	\$2,650

A multiple security portfolio

Where you have a portfolio comprising options over a number of different underlying securities, TIMS calculates the risk and premium margins for the portfolio in a 4 step process:

1. Calculate separate portfolios

The risk and premium margins for options over each underlying security are calculated as if they were separate portfolios.

2. Calculate total premium margin

Next, TIMS calculates the total premium margin for the whole portfolio by adding the individual premium margins calculated in step 1.

3. Calculate total risk margin

TIMS calculates the risk margin for the whole portfolio by adding together the risk margins at the most unfavourable price movement. TIMS calculates the greatest risk for options over each underlying security and also calculates the maximum price move a security is likely to make, (both up and down), and produces the risk margin for the option position in each direction. So if the greatest

debit occurs when the underlying security falls in price ("downside risk") TIMS applies this debit as the risk margin. If the greatest debit occurs when the underlying security rises in price ("upside risk") TIMS applies this debit as the risk margin. If the risk margin is a credit, TIMS also calculates this.

4. Apply offsets to risk margins

Once TIMS has calculated what the risk margin of each option position is, it then begins to apply offsets. For any credit margin, 30% of this credit amount is used to reduce the debit margin across the portfolio. So for a large portfolio of both debits and credits, 30% of the value of the credits will be applied to the debits. This process is best illustrated by three examples, one for a portfolio of options over the same underlying security, and two for a multiple security portfolio.

Margin calculation for a portfolio of options over the same security

Assume from the previous example that you have invested in options over RIO and have the following option positions in your portfolio:

Step 1: Calculate separate portfolios

RIO position	Current market price
Written 1 x RIO September \$27.00 call	\$1.32
Written 1 x RIO December \$28.00 call	\$1.22

Step 2: Calculate total premium margin

RIO position	Current value	Premium margin
Written 1 Sep \$27.00 call	\$1.32	\$ 1,320 dr
Written 1 Dec \$28.00 call	\$1.22	\$ 1,220 dr
Total		\$2,540 dr

Step 3: Calculate total risk margin

RIO Position	Current value (premium)	Theoretical option value with RIO at \$26.27	Risk margin with RIO at \$26.27	Theoretical option value with RIO at \$29.03	Risk margin with RIO at \$29.03
Written 1 Sep \$27.00 call	\$1.32	\$0.56 cr	\$ 760 cr	\$2.38 dr	\$ 1,060 dr
Written 1 Dec \$28.00 call	\$1.22	\$0.67 cr	\$ 550 cr	\$2.05 dr	\$ 830 dr
Total			\$1,310 cr		\$1,890 dr

In order to calculate the total risk margin, TIMS will calculate the theoretical value of these option contracts over RIO by assuming the price of RIO shares moves up or down by the margin interval.

The previous table shows the risk margin calculations based on a current RIO share price of \$27.65 and a margin interval of 5%.

Again TIMS selects the most unfavourable result and in this case the risk margin for the options over RIO will be \$1,890.

Risk margin	\$1,890 dr
Premium margin	\$2,540 dr
Total margin	\$4,430 dr

Margin calculation for a portfolio of options over several different securities: Portfolio 1

Step 1: Remember that TIMS first calculates risk and premium margins for options over each underlying security as if they were separate portfolios:

Position	Current value	Premium margin
BHP		
Written 1 SEP 20.00 call	1.32	\$ 1,320 dr
Written 1 DEC 21.00 call	0.89	\$ 890 dr
Total		\$2,210 dr
CSR		
Taken 1 SEP 4.50 put	0.25	\$ 250 cr
Written 1 DEC 4.25 call	0.51	\$ 510 dr
Total		\$ 260 dr
MIM		
Taken 1 AUG 0.80 call	0.22	\$ 220 cr
Written 2 OCT1.00 call	2 x 0.10 = 0.20	\$ 200 dr
Total		\$ 20 cr

Step 2: So the total premium margin for this portfolio is:

Position	Premium margin
BHP	\$ 2,210 dr
CSR	\$ 260 dr
MIM	\$ 20 cr
Total	\$2,450 dr

Step 3: TIMS looks at your portfolio to assess the risk margin:

Position	Premium margin	Upside risk	Downside risk	Risk margin
BHP	\$ 2,210 dr	\$ 400 cr	\$ 550 dr	\$ 550 dr
CSR	\$ 260 dr	\$ 200 cr	\$ 400 dr	\$ 400 dr
MIM	\$ 20 cr	\$ 200 dr	\$ 200 cr	\$ 60 cr
Total	\$2,450 dr	\$400 cr	\$750 dr	\$890 dr

In this example the worst case for the BHP holding is if the BHP share price fell, the worst case for the CSR holding is if the CSR share price fell, and the worst case for the MIM holding is if the MIM share price rose.

Step 4: Apply offsets

In this instance the risk is determined to be greatest on the downside (\$750). Your account would be debited \$890 (not \$750), because you get 30% of the MIM credit, not all of it. Remember, 30% of all credits on the downside are applied to the portfolio risk margin. In the above example, 30% of the \$200 cr (\$60 cr) for the MIM position is applied to the risk margin.

Therefore the total risk margin for this portfolio is \$890 dr (\$550 dr + \$400 dr + \$60 cr). The total premium margin for the portfolio is the sum of the premium margin for BHP, CSR and MIM. That is \$2210 dr, \$260 dr and \$20 cr which results in a net total premium margin of \$2450 dr.

So, for our BHP, CSR and MIM portfolio TIMS has calculated a premium margin of \$2450 dr and a risk margin of \$890 dr. Thus the total margin payable is \$3340 dr.

Risk margin	\$ 890 dr
Premium margin	\$2,450 dr
Total margin payable	\$3,340 dr

Margin calculation for a portfolio of options over several different securities: Portfolio 2

	Premium margin	Downside risk	Upside risk	Risk margin
Total LHG positions	\$ 22,500 dr	\$ 4,789 cr	\$ 6,930 dr	\$ 6,930 dr
Total FBG positions	\$ 12,240 dr	\$ 6,237 dr	\$ 5,302 cr	\$ 1,590.60 cr
Total FXJ positions	\$ 500 cr	\$ 4,424 cr	\$ 400 dr	\$ 400 dr
Total	\$34,240 dr	\$2,976 cr	\$2,028 dr	\$5,739.40 dr

To give another example of the margining process for a multiple security portfolio, assume your portfolio has options over shares in Lihir Gold Ltd (LHG), Foster's Brewing Group Ltd (FBG) and Fairfax Holdings Ltd (FXJ). TMS yields the above premium and risk margin calculations.

In this instance the risk in the portfolio is greatest on the upside, as this is where the debit (\$2028) occurs.

Only the FBG position benefits if the market moves up. So when the overall portfolio is considered to have greatest risk on the upside, the FBG position can be used as an offset. 30% of the \$5302 credit for FBG is \$1590.60, and this credit is applied against the debits of the other positions in the portfolio. So the total risk margin payable is \$5739.40.

The premium margin is \$34,240 debit, so the total margin for the portfolio is \$39,979.40 debit (\$34,240 + \$5739.40).

The risk margin covers the potential change in the price of the option contract assuming the maximum probable inter-day movement in the price of the underlying security.

How can LEPO margins be met?

LEPO investors can lodge the same types of collateral as investors in ordinary exchange traded options to cover their risk margins. However, mark-to-market margin obligations must be settled daily by the payment of cash. This is because for every investor required to

pay a mark-to-market margin there is another investor entitled to receive an equivalent mark-to-market margin payment in cash. This cash-in, cash-out process means mark-to-market margin obligations cannot be settled by non-cash collateral.

How are LEPO margins calculated?

To understand the margining process for Low Exercise Price Options (LEPOs) you should first read the LEPO Explanatory Booklet which sets out the features and benefits of LEPOs.

Unlike ordinary exchange traded options, where only the writer is margined, with LEPOs takers as well as writers are margined. This is because the taker of a LEPO does not pay the writer the full premium up front. Instead the taker pays a fraction of the premium (calculated using the margin interval) to OCH and is margined on the balance of the premium outstanding.

Calculating the risk margin

Just like ordinary exchange traded options, the calculation of the risk margin for a LEPO is based on the margin interval for the underlying security. Since the price of the LEPO moves in line with the price of the underlying security, the risk margin for a LEPO is the margin interval multiplied by the price of the underlying security and the number of shares in the contract (usually 1,000). For example, if the price of the underlying security is \$20 and the margin interval is 10% then the risk margin will be \$2,000 [(\$20 x 1,000) x 10%]. As the value of the underlying security changes the amount of risk margin held by OCH will be adjusted to maintain the percentage of the margin interval.

Calculation of the premium margin

The premium margin for an ordinary exchange traded option represents the market value of the option at the close of trading each day. However, for a LEPO, it is calculated as the difference between one day's closing price and the following day's closing price of the LEPO. The margin is determined by marking the position to the LEPO's current market value. This is called the "mark-to-market" margin.

This is further explained in the following example which looks at the margining process for both the taker and the writer of a September LEPO over shares in WMC Limited (WMC). The example covers five trading days, and for realism includes commissions.

Assumptions

1. One WMC LEPO contract was traded at \$7.27 on day 1.
2. On day 1 the closing September WMC LEPO price remains unchanged at \$7.27 (or \$7,270 per contract).
3. Closing WMC share price on day 1 was \$7.32.
4. Broker commission of \$60 was payable by both the taker and the writer.
5. Margin interval for WMC shares is 6%.
6. A cash payment by the investor is abbreviated as PAY.
7. A cash receipt to the investor is abbreviated as RCT.
8. Only cash is applied to meet risk margin obligations.
9. There are 1,000 shares per contract.

On day 1 the two parties trade a WMC LEPO contract at \$7.27.

Date & shareprice	Write a WMC September LEPO	Take a WMC September LEPO
Day 1 WMC = \$7.32	Write 1 WMC Sep LEPO \$ 7.27	Take 1 WMC Sep LEPO \$ 7.27
	Risk margin	Risk margin
	(@ 6% of \$7,320) \$439 PAY	(@ 6% of \$7,320) \$439 PAY
	Mark-to-market margin 0	Mark-to-market margin 0
	Commissions \$ 60 PAY	Commissions \$ 60 PAY
	Daily cash flow* \$499 PAY	Daily cash flow* \$499 PAY

*This is the actual cash payment between the client and their broker.

The writer

To ensure the writer can meet their potential obligations in the event of an adverse market movement in the price of WMC shares, the writer is required to lodge margin cover. The risk margin is equal to the closing price for WMC multiplied by the margin interval, $\$7,320 \times 6\% = \439 . As the price of the LEPO has not moved from the time of trading to the close of trading on day 1 there is no mark-to-market margin payable for day 1.

The taker

While the full premium of the LEPO is \$7,270 the taker is only required to lodge \$439 to cover the risk margin on day 1. This amount represents the closing price for WMC multiplied by the margin interval, $\$7,320 \times 6\% = \439 . As the price of the LEPO has not moved from the time of trading to the close of trading on day 1 there is no mark-to-market margin payable for day 1.

On day 2 the WMC LEPO price has fallen to \$7.16.

Day 2	LEPO trading @ \$ 7.16	LEPO trading @ \$ 7.16
WMC = \$7.18	Risk margin	Risk margin
	(@ 6% of \$7,180) \$431 (\$8 RCT)	(@ 6% of \$7,180) \$431 (\$8 RCT)
	Mark-to-market margin \$110 RCT	Mark-to-market margin \$110 PAY
	8 RCT +	110 PAY -
	110 RCT	8 RCT
	Daily cash flow = \$118 RCT	Daily cash flow = \$102 PAY

The writer

On day 2 OCH recalculates the risk margin. Since WMC share price has fallen 14 cents to \$7.18 the risk margin is now reduced to \$431, a reduction of \$8. As the LEPO price has changed since the close of day 1 the mark-to-market margin is calculated as the difference between the two closing prices $[\$7.27 - \$7.16] \times 1,000 = \$110$. Accordingly the writer of the LEPO is entitled to receive \$118 ($\$8 + \110).

The taker

As for the writer, the risk margin for the taker of the LEPO has fallen to \$431, a reduction of \$8. However as the LEPO price has moved against the taker, falling by 14 cents to \$7.16, OCH calculates a mark-to-market margin of \$110 which is the difference between the two closing prices $[\$7.27 - \$7.16] \times 1,000 = \$110$. Accordingly the taker must pay \$102 ($\$110 - \8).

By the close of trading on day 3 the WMC LEPO price has continued its fall to \$7.09

Day 3 WMC = \$7.12	LEPO trading @	\$ 7.09	LEPO trading @	\$ 7.09
	Risk margin		Risk margin	
	(@ 6% of \$7,120)	\$427 (\$4 RCT)	(@ 6% of \$7,120)	\$427 (\$4 RCT)
	Mark-to-market margin	\$ 70 RCT	Mark-to-market margin	\$ 70 PAY
		70 RCT + 4 RCT		70 PAY - 4 RCT
	Daily cash flow =	\$ 74 RCT	Daily cash flow =	\$ 66 PAY

The writer

As WMC has fallen further on day 3 to \$7.12 the risk margin is further reduced. Again it is calculated as 6% of the closing market value of WMC so on day 3 it is \$427, down from \$431 on day 2. The LEPO price fall also results in another mark-to-market margin adjustment. This is calculated as the difference between the closing prices of the LEPO on day 3 and day 2, $[\$7.16 - \$7.09] \times 1,000 = \$70$. Accordingly, the writer of the LEPO is entitled to receive a total of \$74 (\$4 + \$70).

The taker

On day 3 the risk margin for the LEPO taker is also reduced by \$4. The further decline in the LEPO price will mean the taker has to make another mark to market margin payment. Again this is calculated as the difference between the day 2 and day 3 closing prices of the LEPO or $[\$7.16 - \$7.09] \times 1,000 = \$70$. Accordingly, the taker must make a net payment of \$66 (\$70 - \$4).

On day 4 the closing WMC LEPO price remains at \$7.09

Day 4 WMC = \$7.12	LEPO trading @	\$ 7.09	LEPO trading @	\$ 7.09
	Risk margin		Risk margin	
	(@ 6% of \$7,120)	\$427 (no change)	(@ 6% of \$7,120)	\$427 (no change)
	Mark-to margin-margin	Nil	Mark-to margin-margin	Nil
	Daily cash flow	Nil	Daily cash flow	Nil

Hence there is no change in the margin obligations on day 4 for either the taker or the writer.

On day 5 the LEPO price has fallen to \$6.87 and both the taker and the writer elect to close out their WMC LEPO contract.

Closing out involves the writer buying the same LEPO series they initially sold and the buyer selling the same LEPO series they initially bought. Once the closing out transaction is registered OCH makes the following margin adjustments:

Day 5 WMC = \$6.90	Closing out transaction:		Closing out transaction:	
	Take LEPO trading @	\$ 6.87	Write LEPO trading @	\$ 6.87
	Risk margin returned	\$427 RCT	Risk margin returned	\$427 RCT
	Mark-to-market margin	\$220 RCT	Mark-to-market margin	\$220 RCT
	Commissions	\$ 60 PAY	Commissions	\$ 60 PAY
		427 RCT + 220 RCT - 60 PAY		427 RCT - 220 PAY - 60 PAY
Daily cash flow =	\$587 RCT	Daily cash flow =	\$147 RCT	

The writer

While the position is closed out on day 5 the opening written LEPO is firstly marked-to-market just as for previous days. As the LEPO price has fallen yet again it results in a further mark-to-market margin adjustment. This is calculated as the difference between the closing price of the LEPO on day 4 and the price at which the LEPO was closed out, in this case $[\$7.09 - \$6.87] \times 1000 = \$220$. Next, the risk margin of \$427 is reversed. Accordingly, the writer is entitled to receive an amount of \$647 ($\$220 + \427) less commission. The writer of the LEPO now has no further obligations from that WMC LEPO.

The taker

Closing out for the taker of the LEPO results in the opening taken position firstly being marked-to-market to reflect the change in LEPO price from the close of trading on day 4 and the price at the time when the LEPO was closed out on day 5. This is calculated as a payment of $[\$7.09 - \$6.87] \times 1000 = \$220$. However, as the position is being closed out, the risk margin paid up to day 4 of \$427 is reversed resulting in the taker being entitled to a payment of \$207 ($\$427 - \220) less commission. The investor now has no further obligations from that WMC LEPO.

The table below summarises the sequential cash flows for this particular example:

The writer		The taker	
Total profit/loss = sum of mark-to-market margin payments less costs:		Total profit/loss = sum of mark-to-market margin payments less costs:	
Day 2	\$110 RCT	Day 2	\$110 PAY
Day 3	\$70 RCT	Day 3	\$70 PAY
Day 4	NIL	Day 4	NIL
Day 5	\$220 RCT	Day 5	\$220 PAY
Trading profit	\$400 RCT	Trading loss	\$400 PAY
Less total commissions	\$120 PAY	Less total commissions	\$120 PAY
Net profit	\$280 RCT	Net loss	\$520 PAY

Glossary of terms

Adjustment to options contracts

Adjustments are made when certain events occur that may affect the value of the underlying securities. Examples of adjustments include changing the number of shares per contract and/or the exercise price of options in the event of a new issue or reconstruction of the underlying security. Adjustments are specific to the event affecting the underlying securities. You will need to check in individual cases as to what adjustment (if any) is being made.

American

Refers to an option that is exercisable at any time prior to expiry.

Assignment

The random allocation of an exercise obligation to a writer.

At-the-money

When the price of the underlying security equals the exercise price of the option.

Brokerage

A fee or commission payable to a sharebroker for buying or selling on your behalf.

CHESS

Acronym for Clearing House Electronic Sub-register System. It is the settlement facility for ASX's equities and warrant markets.

Class of options

Option contracts of the same type – either calls or puts – covering the same underlying security.

Closing out

A transaction in which a party who has a taken (written) position, liquidates the position by "writing" (taking) an option in the same series.

Collateral

Assets provided to cover margin obligations.

European

Refers to an option that is only exercisable at expiry.

Exercise

The written notification by the taker of their decision to buy or sell the underlying security pertaining to an option contract.

Haircut

The reduction to the value of collateral calculated by OCH to allow for changes in the market value of the collateral.

Inter-day

From one day to the next.

In-the-money

An option with intrinsic value.

Intra-day

Within a particular day.

LEPO

An acronym for Low Exercise Price Option as traded on ASX's market.

Margin

An amount calculated by OCH to cover the obligations arising from options and LEPO contracts.

Margin cover

Cash or collateral lodged to meet margin requirements.

Margin interval

A measure of the daily volatility of the underlying security expressed as a percentage. It represents the largest most likely inter-day movement in the price of the underlying security.

Margin offset

The reduction in margin obligations brought about by other option positions in your account.

Mark-to-market margin

The process whereby a LEPO position is revalued to its current market value resulting in either a payment to you (if the revaluation is favourable) or a payment by you (if the revaluation is unfavourable).

OCH

Acronym for Options Clearing House, the clearing and settlement facility for all exchange traded options and LEPOs traded on ASX's market.

Out-of-the-money

A call option is out-of-the-money if the market price of the underlying shares is below the exercise price of the option; a put option is out-of-the-money if the market price of the underlying shares is above the exercise price of the options.

Premium

The current market price for an option.

Premium margin

The component of the total margin that represents the current liquidation value of the option position.

Random selection

The method by which an exercise of an option is allocated to a writer.

Risk margin

The component of the total margin that represents the effect that the largest most likely inter-day change in the value of the underlying security (or portfolio of underlying securities) will have on the value of an option position.

Series of options

All contracts of the same class having the same expiry date and the same exercise price.

Taker

The buyer of an option contract.

Theoretical option price

The fair value of an option as calculated by an option pricing model.

TIMS

Acronym for the Theoretical Intermarket Margining System which is the margining system used by OCH.

Total margin

The sum of the premium margin and the risk margin.

Volatility

A measure of the size and frequency of price fluctuations in the underlying security.

Worst case scenario

The value of an option position if the market moves by the amount of the margin interval in the direction which will cause the greatest loss to the position.

Writer

The seller of an option contract.

Further information

Other Explanatory Booklets available

- Understanding Options Trading
- LEPO Explanatory Booklet
- Understanding Options Strategies
- Understanding Trading & Investment Warrants

You can download all of these free booklets from our website at asx.com.au

Courses

'An Introduction to Options' is a practically oriented 4 hour course where audience participation is actively encouraged. No prior knowledge of the options market is necessary. However it is assumed that those attending have a working knowledge of the sharemarket. This course is designed to provide participants with a practical knowledge of how to formulate and analyse different trading strategies and different risk management techniques. This course is also available in Distance Education format.

'Options Trading Strategies' is a 4 hour course which builds on knowledge gained in the introductory course and demonstrates how the basic buying and selling of calls and puts can be used as building blocks for more complex strategies. For further information on educational courses available, or for complimentary copies of the above booklets, please complete the form and mail it to the nearest Derivatives Division office.

Alternatively you can call the Derivatives Division on one of the telephone numbers listed below or contact your broker.

Website: asx.com.au

Email: derivatives@asx.com.au

Derivatives Division's toll free information line: 1800 028 585.

Sydney

20 Bridge Street, Sydney NSW 2000

Telephone: (02) 9227 0510

Facsimile: (02) 9227 0722

You can download free booklets from our website at asx.com.au

Derivatives
Division
1800 028 585



Please send me;

1. Information on the educational courses offered by the Derivatives Division
2. The following booklets:

.....
.....
.....

Name

.....

Address

.....

Postcode

.....

ASX Derivatives

A division of Australian Stock Exchange Limited
(ABN 48 001 314 503)

Disclaimer of liability

Although Australian Stock Exchange Limited has made every effort to be accurate, it does not guarantee the accuracy of the information in this booklet. Accordingly Australian Stock Exchange Limited shall, to the extent permitted by law, not be liable for any loss or damage suffered by any person arising from any act or thing done or omitted to be done by any person in reliance upon all or any part of the information in this booklet.

General information only

The information in this booklet is for education purposes only and no person shall invest monies or take or fail to take any other action in reliance upon the information in this booklet but should instead satisfy themselves independently (whether by way of expert advice or otherwise) of the appropriateness of such action or inaction.

Copyright

No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior written permission of Australian Stock Exchange Limited. Copyright by Australian Stock Exchange Limited. ABN 48 001 314 503. All rights reserved.

Trademarks

All Ordinaries and SEATS are registered trademarks of ASX Operations PTY Limited (ABN 42 004 523 782). CHESS is a registered trademark of ASX Settlement and Transfer Corporation Pty Limited (ABN 49 008 504 532).



is a trademark of ASX Operations Pty Ltd

SetP™ is a trademark of Standard & Poor's, a division of The McGraw-Hill Companies, Inc.

Edition 4 August 2000.



ASX

AUSTRALIAN STOCK EXCHANGE

Derivatives Division toll free information line: 1800 028 585. Internet: www.asx.com.au