Margins

ASX Clear

ASX CLEARING CORPORATION

Before you begin

This booklet explains how ASX Clear calculates margins for options traded on ASX's option market. You should note that brokers' margins may be different from ASX Clear. (This is explained further on page 3).

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 ASX Clear 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 **www.asx.com.au/resources/publications/booklets.htm** or by contacting ASX or your broker.

The terminology associated with margins is explained in the Glossary of Terms on page 13.

Throughout this booklet examples are used to explain how the margining system works. All examples assume an option contract size of 100 shares and, for simplicity of explanation, ignore exchange fees or commissions that may also be payable. Examples are provided for illustrative purposes only and may not reflect current market levels.

Note: A calculator that enables you to estimate your margin position is available on the ASX website at **www.asx.com.au/opc/OpcStart**

What are margins?

Definition: a margin is the amount calculated by ASX Clear 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 ASX Clear. ASX Clear recalculates margins at the end of each day to ensure an adequate level of margin cover is maintained. ASX Clear 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 by your broker 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 5.

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 100 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 100 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 100 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 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 $12.00 put option. You have the obligation to buy 100 WOW shares at $12.00 if the taker exercises their right to sell. In return for taking on the obligation to buy 100 WOW shares at $12.00, you will receive the option premium. In our example, the option premium is $0.35 per share or $35 (35 cents x 100 shares) 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 $12.00 put option you will have to pay the premium of $35 to the writer. As the taker you have the right to sell the WOW shares at $12.00.

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 ASX Clear 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 call options, may suffer losses if the underlying security rises in value, and therefore writers of both LEPOs and ordinary exchange traded call options are required to lodge margin cover. A full explanation of the margining process for LEPOs can be found on page 10.

How can margins be met?

Margin obligations are calculated at the end of trading each day and ASX Clear 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 ASX Clear, it is the broker who has the legal obligation to settle with ASX Clear. Each broker's total margin obligations must be lodged with ASX Clear by 11.00 am the same day.

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

Margins from your broker may be different to ASX Clear

ASX Clear'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 ASX Clear if your broker uses a different margining standard to ASX Clear. The explanations throughout this booklet apply where your broker adopts the same margining as ASX Clear.

Cash

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

Collateral

In addition to, or as an alternative to cash, you may wish, (subject to your broker and/or ASX Clear agreeing), to provide certain types of collateral.

ASX Clear accepts your collateral as a third party, as you are providing it to ASX Clear as security for your broker's margin obligations to ASX Clear. Your broker may allow you to provide collateral which is different to what ASX Clear 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 ASX Clear 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.

Details of eligible collateral are published on the ASX website at **www.asx.com.au/products/options/trading_information/eligible_collateral.htm**

How are margins calculated?

Note: A calculator that enables you to estimate your margin position is available on the ASX website at **www.asx.com.au/opc/OpcStart**

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 $38 ($0.38 x 100 shares per contract) as margin cover. However, this does not take into consideration the possibility of inter-day price movements. In reality, ASX Clear calculates margins using a sophisticated system known as the ASX Derivaties Margining System (ADMS), an internally developed replica of the CM-TIMS algorithm.

ADMS 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, ASX Clear may call for extra margin cover to be lodged during the day (i.e. an intra-day margin call) to cover changes in value of the underlying securities.

ADMS 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 requirement the following day would be $35 per contract. At the end of day 2, if the option is valued at $0.45 the premium margin component of the total margin requirement the following day would be $45 per contract. At the end of day 3, if the option is valued at $0.40, the premium margin component of the total margin requirement the following day would be $40 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	$35	$45	$40	$36
Premium margin	$35	$45	$40	$36

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 assessed maximum probable inter-day movement in the price of the underlying security.

To calculate the additional margin, ADMS uses the published margin interval. The margin interval is determined through various observations over a period for each underlying.

For example, assume Telstra has a current share price of $4.18. Based on an analysis of the price of Telstra shares over recent times, the margin interval for Telstra has been set at 5%, in other words, the Telstra share price could fall as low as $3.97 ($4.18 minus 5%) or rise as high as $4.39 ($4.18 plus 5%), but it is unlikely to be outside this range.

The margin intervals for all classes of options are regularly monitored to ensure they remain appropriate. Once the margin interval for a particular class of options has been determined, ADMS 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, ADMS would determine where your Telstra option position has the greatest loss, that is at $3.97, $4.39 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 the theoretical option price and the current option price.

For a call option writer, the worst case scenario would arise if the market rose. Therefore ADMS calculates the theoretical option value of the position (or positions) held by the call writer assuming the underlying security rises by the maximum probable interday amount. For the put option writer, however, the worst case scenario would arise if the market fell. Therefore ADMS calculates the theoretical option value 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 the option premium paid.

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

Using the Telstra example to explain this, assume the Telstra share price is now $4.18 and you are the writer of a Telstra Sep $4.00 call worth $0.33. At the end of each day ADMS calculates the worst case theoretical option price for a Telstra Sep $4.00 call. In this example it does this by assuming an increase in the share price of Telstra to $4.39 ($4.18 plus 5%). It then uses the $4.39 theoretical share price to calculate a theoretical option price of $0.47. The risk margin is therefore $0.14, that is the theoretical option price ($0.47) less the current option price ($0.33).

If you had written a Telstra Sep $3.75 put option, ADMS would calculate the theoretical option price for this example by assuming a decrease in the Telstra share price by the margin interval to $3.97 ($4.18 less 5%). Your risk margin would be the difference between the current market value of the put option with the shares at $4.18 and the theoretical value of the option if the shares were at $3.97, that is $0.07 ($0.19 less $0.12 in the table on page 5).

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

See the table below for a further explanation. Calculations are based on a Telstra share price at the close of business of $4.18 and a margin interval of 5%.

	SOLD TELSTRA SEP $4.00 CALL	SOLD TELSTRA SEP $3.75 PUT
Market value at the close of business	$0.33	$0.12
Theoretical market value if the share price (worst case) rose 5% to $4.39*	$0.47	$0.07
Theoretical market value if the share price (worst case) fell 5% to $3.97*	$0.21	$0.19
Risk margin	$0.47 - $0.33 = $0.14	$0.19 - $0.12 = $0.07

* Note that for simplicity the maximum and minimum risk margin is assumed to arise from the +/- 5% moves. However, depending on the option profile, the maximum risk margin could arise from a price move between -5% and 5%.

This demonstrates how ADMS 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 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 above examples, if the premium margin (which is the same as the current value) for the Telstra Sep $4.00 call is $0.33 and the risk margin is $0.14, then the total margin is $0.47. If the premium margin for the Telstra Sep $3.75 put is $0.12 and the risk margin is $0.07, then the total margin is $0.19.

You may have noticed that in the above examples the total margin payable is the same as the theoretical price of the option 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.

Offsets

Offsets serve to reduce a percentage of the total margin payable by allowing a portion of the available credit to "offset" debit positions. Offsets are allowed within a security and across a multi-security portfolio. The way offsets work is explained in the following sections.

RISK MARGIN + PREMIUM MARGIN = TOTAL MARGIN

How are margins calculated for a portfolio?

If you have a number of options positions registered in your account ADMS will evaluate the entire options portfolio and calculate total margin obligations accordingly.

A single security portfolio

ADMS calculates your margin obligations for all options in one class together. For example, assume you only have options over ANZ which has a current share price of $16.82.

IN THE ACCOUNT ARE THE FOLLOWING POSITIONS	CURRENT MARKET VALUE
Taken 1 x October $17.00 put	$1.17
Written 2 x April $15.50 puts	$0.13 ea
Written 1 x July $16.00 call	$1.35
Written 1 x October $16.50 call	$1.26

Risk margin calculations for single security portfolios

Firstly, ADMS uses the margin interval to calculate the maximum probable interday rise and fall in the underlying security. That is, if the margin interval for ANZ is 5%, then ADMS calculates theoretical prices based on the maximum interday rise in ANZ's share price to $17.66 ($16.82 plus 5%) and the maximum interday fall to $15.98 ($16.82 less 5%).

Secondly, ADMS uses these prices to calculate the theoretical value of each position in the portfolio.

Premium margins are offset between series

This is shown in the table on the next page. 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.

ADMS 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. ADMS then adds together the risk margins for each of the different series. In adding these together ADMS treats favourable underlying price movements as positive (credit) and unfavourable underlying price movements as negative (debit).

ADMS then selects the most unfavourable total figure as the risk margin for the portfolio, in this example $139.

POSITION	CURRENT VALUE (PREMIUM)	THEORETICAL OPTION VALUE ANZ AT $15.98	RISK MARGIN ANZ AT $15.98	THEORETICAL OPTION VALUE ANZ AT $17.66	RISK MARGIN ANZ AT $17.66
Taken 1 Oct $17.00 put	$1.17	$1.67	$50 cr	$0.80	$37 dr
Written 2 Apr $15.50 puts	$0.13 ea	$0.33 ea	$40 dr	$0.04 ea	$18 cr
Written 1 Jul $16.00 call	$1.35	$0.83	$52 cr	$1.99	$64 dr
Written 1 Oct $16.50 call	$1.26	$0.81	$45 cr	$1.82	$56 dr
Total			**$107 cr**		**$139 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 ANZ option and four written ANZ 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	$1.17	$117 cr
Written 2 Apr $15.50 puts	2 x 0.13 = $0.26	$26 dr
Written 1 Jul $16.00 call	$1.35	$135 dr
Written 1 Oct $16.50 call	$1.26	$126 dr
Total		$170 dr

*For premium margin calculations, bought positions are treated as favourable (i.e. credits) and sold positions as unfavourable (i.e. debits). This is because bought positions offset sold positions.

In this example the total premium margin would be $170. Note that while a net written position (i.e. where the end result is unfavourable) is margined, a net taken position (i.e. 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 ANZ portfolio example the total margin requirement will be:

RISK MARGIN	$139
PREMIUM MARGIN	$170
TOTAL MARGIN PAYABLE	$309

A multiple security portfolio

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

1. Calculate separate portfolios

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

2. Calculate total premium margin

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

3. Calculate total risk margin

ADMS uses the margin interval to calculate the maximum probable inter-day move in a security. ADMS calculates theoretical prices at 5 equi-distant levels on the upside and 5 equi-distant on the downside based upon the maximum probable inter-day move.

Upside risk (when the underlying security rises in price) and downside risk (when the underlying security falls in price) is calculated for each position in the portfolio.

ADMS then groups positions according to the underlying security and sums the upside and downside risk.

4. Apply offsets to risk margins

Once ADMS has calculated the risk margin (i.e. upside and downside risk) of each underlying security in the portfolio, it then begins to apply offsets. Where there is a credit margin, say on the upside, 30% of this credit amount is used to reduce the upside debit margin across the portfolio. This process is best illustrated by two 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 you have the following RIO option positions in your portfolio:

Step 1: Calculate separate portfolios

RIO POSITION	CURRENT MARKET PRICE
Written 1 x RIO Sep $34.00 call	$2.05
Written 1 x RIO Dec $34.00 call	$2.58

Step 2: Calculate total premium margin

RIO POSITION	CURRENT VALUE	PREMIUM MARGIN
Written 1 Sep $34.00 call	$2.05	$205 dr
Written 1 Dec $34.00 call	$2.58	$258 dr
Total		**$463 dr**

Step 3: Calculate total risk margin

RIO POSITION	CURRENT VALUE (PREMIUM)	THEORETICAL OPTION VALUE RIO AT $32.03	RISK MARGIN RIO AT $32.03	THEORETICAL OPTION VALUE RIO AT $35.41	RISK MARGIN RIO AT $35.41
Written 1 Sep $34.00 call	$2.05	$1.29 cr	$76 cr	$3.03 dr	$98 dr
Written 1 Dec $34.00 call	$2.58	$1.75 cr	$83 cr	$3.56 dr	$98 dr
Total			**$159 cr**		**$1,96 dr**

In order to calculate the total risk margin, ADMS calculates the theoretical value of these options by assuming the price of RIO shares moves up or down by the margin interval.

The table above shows the risk margin calculations based on a current RIO share price of $33.72 and a margin interval of 5%.

Next, ADMS selects the most unfavourable result and in this case the risk margin for the options over RIO will be $196 dr.

RISK MARGIN	$196 DR
PREMIUM MARGIN	$463 DR
TOTAL MARGIN PAYABLE	$659 DR

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

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

POSITION	CURRENT VALUE	PREMIUM MARGIN
AMP		
Written 1 Sep $7.00 call	$0.82	$82 dr
Written 1 Dec $7.25 call	$0.75	$75 dr
Total		**$157 dr**
BXB		
Taken 1 Aug $6.50 put	$0.385	$38.50 cr
Written 1 Aug $7.00 call	$0.255	$25.50 dr
Total		**$13.00 cr**
DJS		
Taken 1 Jul $1.50 call	$0.12	$12.00 cr
Written 2 Oct $1.60 put	2 x $0.26 = $0.52	$52.00 dr
Total		**$40.00 dr**

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

POSITION	PREMIUM MARGIN
AMP	$157 dr
BXB	$13 cr
DJS	$40 dr
Total	**$184.00 dr**

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

POSITION	PREMIUM MARGIN	UPSIDE RISK	DOWNSIDE RISK	RISK MARGIN
AMP	$157 dr	$71 dr	$58 cr	$71 dr
BXB	$13 cr	$25 dr	$25 cr	$25 dr
DJS	$40 dr	$22 cr	$22 dr	$6.60 cr
Total	**$184 dr**	**$74 dr**	**$61 cr**	**$89.40 dr**

In this example the worst case for the AMP holding is if the AMP share price rose, the worst case for the BXB holding is if the BXB share price rose, and the worst case for the DJS holding is if the DJS share price fell.

Step 4: Apply offsets

In this instance the risk is determined to be greatest on the upside ($74 dr). The risk margin charged will be the full upside risk for the two stocks in debit (AMP $71 dr, BXB $25 dr). For DJS, which is a credit value of $22 in the upside risk assessment, 30% of the credit value is permitted as an offset ($22 cr x 30% = $6.60 cr).

Therefore the total risk margin for this portfolio is $89.40 dr ($71 dr + $25 dr + $6.60 cr). The total premium margin for the portfolio is the sum of the premium margin for AMP, BXB and DJS. That is $157 dr, $13 cr and $40 dr which results in a net total premium margin of $184 dr.

So, for our AMP, BXB and DJS portfolio ADMS has calculated a premium margin of $184 dr and a risk margin of $89.40 dr. Thus the total margin payable is $273.40 dr.

RISK MARGIN	$89.40 DR
PREMIUM MARGIN	$184 DR
TOTAL MARGIN PAYABLE	$273.40 DR

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

POSITION	PREMIUM MARGIN	UPSIDE RISK	DOWNSIDE RISK	RISK MARGIN
Total LGL positions	$2,250 dr	$478.90 cr	$693 dr	$693 dr
Total FGL positions	$1,224 dr	$623.70 dr	$530.20 cr	$159.06 cr
Total FXJ positions	$50 cr	$442.40 cr	$40 dr	$40 dr
Total	**$3,424 dr**	**$297.60 cr**	**$202.80 dr**	**$573.94 dr**

Above is another example of the margining process for a multiple security portfolio, assume your portfolio has options positions in Lihir Gold Ltd (LGL), Foster's Group Ltd (FGL) and Fairfax Holdings Ltd (FXJ). ADMS calculates the above premium and risk margins.

In this instance the risk in the portfolio is largest on the downside.

As the risk is greater on the downside, the credit arising from the FGL positions is used to partially offset the total risk margin. Thus a credit of $159.06 (30% of $530.20) is applied against the debit risk margins in the portfolio.

With a premium margin of $3,424 dr, the total margin for the portfolio is $3,997.94 dr ($3,424 + $573.94).

The risk margin covers the change in the price of an option assuming a 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. This booklet can be downloaded from the ASX website, at **www.asx.com.au/ resources/ publications/booklets.htm**

Unlike ordinary exchange traded options, where only the writer is margined, with LEPOs both the taker and the writer are margined. This is because the taker of a LEPO does not pay the writer the full premium up front. As such, the taker is margined as they have an obligation to pay the premium.

Calculating the risk margin

Just like ordinary options, the calculation of the risk margin for a LEPO is based on the margin interval of 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 calculated by multiplying the margin interval by the price of the underlying security and the number of shares in the contract (usually 100). For example, if the price of the underlying security is $20 and the margin interval is 10% then the risk margin will be $200 [($20 x 100) x 10%]. As the value of the underlying security changes so too will the amount of risk margin.

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. For a LEPO, however, the premium margin is the difference between the closing prices of the LEPO from one day to the next. The margin is calculated 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 AMP Limited (AMP). The example covers five trading days.

Assumptions

1. One AMP LEPO contract was traded at $7.27 on day 1.
2. On day 1 the closing September AMP LEPO price remains unchanged at $7.27 (or $727 per contract).
3. Closing AMP share price on day 1 was $7.32.
4. Margin interval for AMP shares is 6%.
5. A cash payment by the investor is abbreviated as PAY.
6. A cash receipt to the investor is abbreviated as RCT.
7. Only cash is applied to meet risk margin obligations.
8. There are 100 shares per contract.

On day 1 the two parties trade an AMP LEPO contract at $7.27.

DATE & SHARE PRICE	WRITE AN AMP SEPTEMBER LEPO		TAKE AN AMP SEPTEMBER LEPO	
Day 1 AMP = $7.32	Write 1 AMP Sep LEPO	$7.27	Take 1 AMP Sep LEPO	$7.27
	Risk margin (@ 6% of $732)	$43.92 PAY	Risk margin (@ 6% of $732)	$43.92 PAY
	Mark-to-market margin	0	Mark-to-market margin	0
	Daily cash flow*	$43.92 PAY	Daily cash flow*	$43.92 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 AMP shares, the writer is required to lodge margin cover. The risk margin is equal to the closing price for AMP multiplied by the margin interval, $732 x 6% = $43.92. 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

To ensure the taker can meet their obligations to pay the premium, the taker is required to lodge margin cover of $43.92 on day 1. This amount represents the closing price for AMP multiplied by the margin interval, $732 x 6% = $43.92. 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 AMP LEPO price has fallen to $7.16.

DATE & SHARE PRICE	WRITE AN AMP SEPTEMBER LEPO		TAKE AN AMP SEPTEMBER LEPO	
Day 2 AMP = $7.18	LEPO trading @	$7.16	LEPO trading @	$7.16
	Risk margin (@ 6% of $718)	$43.08 ($0.84 RCT)	Risk margin (@ 6% of $718)	$43.08 ($0.84 RCT)
	Mark-to-market margin	$11.00 RCT	Mark-to-market margin	$11.00 PAY
	Daily cash flow (0.84 RCT + 11 RCT)	$11.84 RCT	Daily cash flow (11.00 PAY – 0.84 RCT)	$10.16 PAY

The writer

On day 2 AMP's share price has fallen $0.14 to $7.18, the risk margin is now $43.08, (718 x 6%) a reduction of $0.84. 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] x 100 = $11. Accordingly, the writer of the LEPO is entitled to receive $11.84 ($0.84 + $11.00).

The taker

As for the writer, the risk margin for the taker has fallen to $43.08 (718 x 6%), a reduction of $0.84. However as the LEPO price has moved against the taker, falling by $0.11 to $7.16, ASX Clear calculates a mark-to-market margin of $11. Accordingly, the taker must pay $10.16 ($11 – $0.84).

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

DATE & SHARE PRICE	WRITE AN AMP SEPTEMBER LEPO		TAKE AN AMP SEPTEMBER LEPO	
Day 3 AMP = $7.12	LEPO trading @	$7.09	LEPO trading @	$7.09
	Risk margin (@ 6% of $712)	$42.72 ($0.36 RCT)	Risk margin (@ 6% of $712)	$42.72 ($0.36 RCT)
	Mark-to-market margin	$7 RCT	Mark-to-market margin	$7 PAY
	Daily cash flow (7 RCT + 0.36 RCT)	$7.36 RCT	Daily cash flow (7 PAY – 0.36 RCT)	$6.64 PAY

The writer

As AMP has fallen further on day 3 to $7.12 the risk margin is now $42.72 (a reduction of $0.36), down from $43.08 on day 2. The LEPO price fall also results in another mark-to-market margin adjustment. The mark-to-market margin on day 3 is $7 [($7.16 - $7.09) x 100]. Accordingly, the writer of the LEPO is entitled to receive $7.36 ($0.36 + $7).

The taker

The risk margin for the LEPO taker is also reduced by $0.36. The further decline in the LEPO price will mean the taker making another mark-to-market margin payment. Accordingly, the taker must make a payment of $6.64 ($7 – $0.36).

On day 4 the closing AMP LEPO price remains at $7.09

DATE & SHARE PRICE	WRITE AN AMP SEPTEMBER LEPO		TAKE AN AMP SEPTEMBER LEPO	
Day 4 AMP = $7.12	LEPO trading @	$7.09	LEPO trading @	$7.09
	Risk margin (@ 6% of $712)	$42.72 (no change)	Risk margin (@ 6% of $712)	$42.72 (no change)
	Mark-to-market margin	Nil	Mark-to-market 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 AMP 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 ASX Clear makes the following margin adjustments:

DATE & SHARE PRICE	WRITE AN AMP SEPTEMBER LEPO		TAKE AN AMP SEPTEMBER LEPO	
Day 5 AMP = $6.90	Take LEPO trading @	$6.87	Write LEPO trading @	$6.87
	Risk margin returned	$42.72 RCT	Risk margin returned	$42.72 RCT
	Mark-to-market margin	$22 RCT	Mark-to-market margin	$22 PAY
	Daily cash flow (42.72 RCT + 22 RCT)	$64.72 RCT	Daily cash flow (42.72 RCT – 22 PAY)	$20.72 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] x 100 = $22. Next, the risk margin of $42.72 is reversed. Accordingly, the writer is entitled to receive $64.72 ($22 + $42.72). The writer of the LEPO now has no further obligations.

The taker

Closing out for the taker results in the opening taken position firstly being marked-to-market to reflect the change in the LEPO price from the close of trading on day 4 to the close out price of the LEPO on day 5, in this case a payment of $22 [($7.09 – $6.87) x 100]. However, as the position is closed out, the risk margin of $42.72 is reversed. Accordingly, the taker is entitled to receive $20.72 ($42.72 - $22). The taker of the LEPO now has no further obligations.

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

THE WRITER TOTAL PROFIT/LOSS = SUM OF MARK-TO-MARKET MARGIN PAYMENTS LESS COSTS:		THE TAKER TOTAL PROFIT/LOSS = SUM OF MARK-TO-MARKET MARGIN PAYMENTS LESS COSTS:	
Day 1	0	Day 1	0
Day 2	$11 RCT	Day 2	$11 PAY
Day 3	$7 RCT	Day 3	$7 PAY
Day 4	NIL	Day 4	NIL
Day 5	$22 RCT	Day 5	$22 PAY
Trading profit	**$40 RCT**	**Trading loss**	**$40 PAY**

Glossary of terms

ASX Clear

The clearing and settlement facility for all exchange traded options, LEPOs and futures traded on ASX Trade.

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.

ADMS

Acronym for the ASX Derivatives Margining System which is the margining system used by ASX Clear.

American

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 covering the same underlying security.

Closing out

A transaction which involves taking the opposite side to the original position i.e. if the opening position is taken (written) closing out would involve writing (taking) an option in the same series.

CM-TIMS

Clearing Members - Theoretical Intermarket Margin System (CM-TIMS) is the margining system developed by the Options Clearing Corporation (OCC).

Collateral

Assets provided to cover margin obligations.

European

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

A reduction in the value of securities lodged to cover margins.

Inter-day

From one business day to the next business day, or from one business day to the next business day plus one day.

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 options market.

Margin

An amount calculated by ASX Clear 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 as a result of other option positions in your portfolio.

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).

Out-of-the-money

An option with no intrinsic value. 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

A component of the total margin that represents the current value of the option.

Random selection

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

Risk margin

A component of the total margin that represents the potential liquidation loss on the option as a result of the largest probable interday change in the value of the underlying security.

Series of options

All contracts of the same class and type having the same expiry day 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.

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.

Writer

The seller of an option contract.

Further information

For ASX explanatory booklets on options, please phone 131 279, or download the booklets from the ASX website **www.asx.com.au/options**

Online Classes

Online options classes include interactive exercises that will aid your learning and a quiz at the end of each section to show your progress.

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