



Overview of Margining Equity Style Options

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1.Introduction

This document provides an understanding of Equity style options, also called Premium paid up front options. These options do not have futures style margining applied to them, so therefore do not have daily realised variation margin consideration. Premium is paid from the Buyer to the Seller when the option is first traded. The concept of NLV (Net Liquidation Value) is then introduced to enable the LCH.Clearnet Limited (LCH.C) to close out a position in the event of a default. A more in depth description of NLV can be found later in this document.

2. Contracts that use Equity Style Margining

The following contracts use Equity Style Margining:

- Options on Liffe Equities
- Options on LME
- Options on Freight (at present only CTC, PTC and STC contracts)

3.Examples of Equity Style Margining

The simplest way to look at these options is to look separately from the point of view of a buyer and seller. We will start by looking from the buyer's point of view.

Buyer (On trade date)

- Buys an Option.
- Premium is paid to the seller via LCH.C.



- Initial Margin (IM) is paid to LCH.C and is calculated using London SPAN.
- A credit Net Liquidation Value (NLV) is received. This credit is paid as the option is considered an asset that could be used in the event of default to offset any other losses the buyer may have. The NLV represents the current value of this asset.

Note: The credit NLV received will nearly always cover any IM requirement resulting from the trade. Any excess credit NLV can be used to offset any debit NLV and IM across positions in the same contract family.

Buyer (Day 2)

- The price for the option goes up.
- Again IM will be paid to LCH.C. IM is re-valued on a daily basis through London SPAN to account for change in options price and time to expiry. Any increases in IM will need to be paid, whilst decreases in IM will be returned to the buyer or held on the buyers account.
- NLV will be re valued using the following formula:

$$NLV = Price\ of\ Option \times Contract\ size \times Number\ of\ lots.$$

Since the option price has risen, buyers credit NLV will increase.

Buyer (At expiry)

- If the option finishes 'in the money', the buyer will choose to exercise and receive the asset at the strike price. The remaining NLV on the Buyers account will become the Variation Margin (VM) on the futures position.
- IM will now be charged on the resulting futures position.
- Credit NLV will be at zero as the option has expired.

Seller (On trade date)

- Sells an Option
- Premium is paid to the seller via LCH.C.



- Initial Margin (IM) is paid to LCH.C and is calculated using London SPAN.
- Debit Net Liquidation Value (NLV) is paid to LCH.C. This debit is paid as if the seller were to default then LCH.C would need to close out the option by buying it back in the market. LCH.C must therefore recognise the seller's liability under the options contract. To recognise this liability NLV is used to measure the current value of the options contract. Debit NLV can be covered with either cash or acceptable non cash collateral. (See Acceptable collateral list under Risk Management/Collateral Management on the LCH.C website)

Seller (Day 2)

- The price for the option goes up.
- Again IM will be paid to LCH.C. IM is re-valued on a daily basis through London SPAN to account for change in options price and time to expiry. Any increases in IM will need to be paid, whilst decreases in IM will be returned to the seller or held on the sellers account.
- NLV will be re valued using the following formula:

$$NLV = Price\ of\ Option \times Contract\ size \times Number\ of\ lots.$$

Since the option price has risen the seller's debit NLV will increase. Additional funds or collateral will therefore need to be lodged with LCH.C to cover this increase.

Seller (At expiry)

- If the option finishes 'in the money', the buyer will choose to exercise and receive the futures at the strike price. The remaining NLV on the Sellers account will become the Variation Margin (VM) on the futures position.
- IM will now be charged on the resulting futures position.
- Debit NLV will be at zero as the option has expired.

4. Worked example

The example below looks at the cash flows for the following options trade:

DEC 08 2200 Call @ €2.30.

Contract Size = 1000 per lot

Date	Option Price	BUYER				SELLER			
		Premium	IM	NLV	VM	Premium	IM	NLV	VM
Day 1 (Trade Input)	€ 2.30	0	0	0	0	0	0	0	0
Day 1 (End of day)	€ 2.50	-€ 2,300	-€ 1,276	€ 2,500	0	€ 2,300	-€ 1,276	-€ 2,500	0
Day 2 (Option price rises to €3.00)	€ 3.00	0	-€ 1,472	€ 3,000	0	0	-€ 1,472	-€ 3,000	0
Day 3 (Option Expires at €2.80)	€ 2.80	0	-€ 1,400	0	€ 2,800	0	-€ 1,400	0	-€ 2,800

The following table shows the Profit and Loss resulting from the options trade.

	Buyer	Seller
Premium	-€ 2,300.00	€ 2,300.00
Realised VM of exercised option	€ 2,800.00	-€ 2,800.00
Profit/Loss	€ 500.00	-€ 500.00

5. Frequently Asked Questions

There are a number of questions that get asked frequently regarding the above process.

1) What is Net Liquidating Value (NLV)?

Net Liquidation Value = *Price of option x Contract Size x Number of lots.*

With Equity style options you do not realise Variation Margin (VM) or profit/loss on a daily basis, VM is only realised on Expiry or Exercise. As VM is not received daily, LCH.C uses the concept of NLV to margin members. The NLV is recalculated on a daily basis and is seen as the amount of money that LCH.C would require in order to close out a member's position in the event of a member default. In general the following rules apply to NLV:

- When a buyer purchases an option they receive a credit NLV on their account. This credit will nearly always offset, or in many cases be greater than, the IM payment made to LCH.C when the trade was originally opened.
- When a seller sells an option they pay debit NLV to LCH.C.
- Credit NLV can be used to offset debit NLV and also IM on any contract within the same contract family. For example, credit NLV made on an LME option contract can only be used as an offset on other contracts within the LME family; it cannot be used to offset IM on any other Exchange.

2) If I am the buyer of an option and have already paid my premium, do I need to pay Initial Margin?

As part of the margining process SPAN is required to calculate Initial margin on all positions. In the case of Premium paid up front options the premium is paid via LCH.C to the options seller when the position is first opened. Therefore in essence the position could be seen as risk free as in the event of a default by a Clearing Member who is long options LCH.C has no obligation to the seller of the option as their premium has already been received. It could therefore be assumed that no IM would need to be paid for buyers of long options, however as mentioned earlier SPAN is required to calculate IM on all positions. To counteract this process the concept of NLV is introduced. When the position is first opened Credit NLV is received by the buyer of the option. This credit will always offset or in some cases be greater than the IM calculated by SPAN. Therefore it can be said that a buyer of an option has no net margin requirement.

The following screenshot taken from PC London SPAN shows the total net margin for a simple long option. As you can see from the highlighted section no IM is actually paid on the position. Instead a Credit NLV of 73 is received.

$$\begin{array}{|c|} \hline \text{Initial} \\ \text{Margin} \\ \hline -652 \\ \hline \end{array}
 +
 \begin{array}{|c|} \hline \text{NLV} \\ \hline 725 \\ \hline \end{array}
 =
 \begin{array}{|c|} \hline \text{Net} \\ \text{Margin} \\ \hline 73 \\ \hline \end{array}$$

Net Margin by Margin Group

LCH SPAN Ver 4.0 THE LONDON CLEARING HOUSE LIMITED DATE: 21 APR 2008
RPT NMG Net Margin Report by Margin Group PAGE: 1

ACCOUNT: AAABBB

MARGIN GROUP	CURRENCY	INITIAL MARGIN	NET LIQUIDATION VALUE	CONTINGENT VARIATION MARGIN	DISCOUNTED VARIATION MARGIN	NET MARGIN
BQY	GBP	-652	725.000	0.000	0.000	73.000
Account Totals:						
	GBP					0.000

Note: A credit net margin in one margin group cannot offset a debit net margin in another margin group

*** END OF REPORT ***

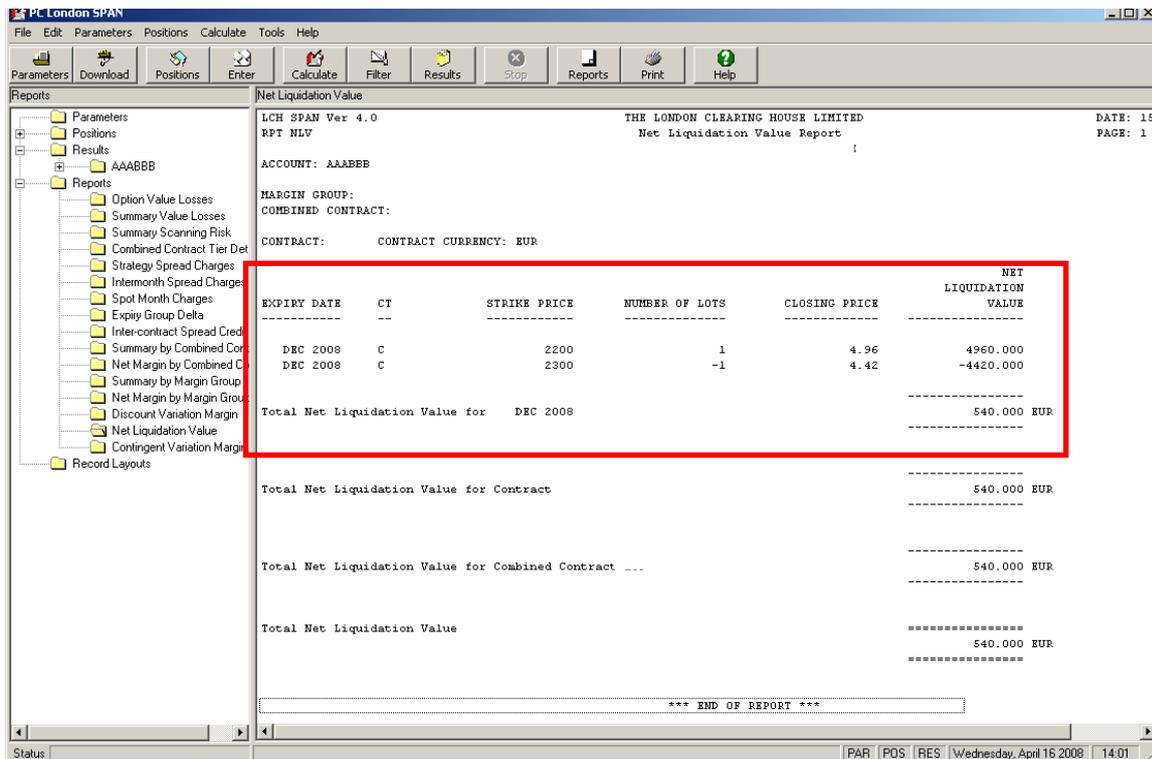
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3) If I have offsetting options positions in my portfolio is my margin netted?

In the case of offsetting positions, margins are netted in order to reduce total margin requirements. Below is an example from PC London SPAN showing a long and short Call. NLV is calculated separately for each position as demonstrated below:

Closing Price of Option 4.96	×	Contract Size 1000 per lot	×	Number of Lots 1	=	NLV for Long Call 4960
Closing Price of Option 4.42	×	Contract Size 1000 per lot	×	Number of Lots -1	=	NLV for Short Call -4420
NLV for Long Call 4960	+	NLV for Short Call -4420	=	Total NLV 540		

This first screenshot shows the calculation of NLV and the resulting offset.



This next screenshot shows the total net margin for the positions. Notice that the credit NLV more than offsets the Initial margin value, resulting in a net Credit.

The screenshot displays the 'Net Margin by Margin Group' report from the LCH SPAN software. The report is for account AAABBB and is dated 15 APR 2008. The table below shows the breakdown of margin components for a margin group in EUR.

MARGIN GROUP	CURRENCY	INITIAL MARGIN	NET LIQUIDATION VALUE	CONTINGENT VARIATION MARGIN	DISCOUNTED VARIATION MARGIN	NET MARGIN
	EUR	-99	540.000	0.000	0.000	441.000
Account Totals:						
	EUR					0.000

Note: A credit net margin in one margin group cannot offset a debit net margin in another margin group

*** END OF REPORT ***

If there were any further positions in this example then the net credit of €441 would be used to offset any IM or debit NLV arising.

6.Glossary Of Terms

At-the-money

An option or warrant where the exercise price is equal to the current market price of the asset subject to the option. For example, a call option with an exercise price of 100p on a share with a share price of 100p is at-the-money.

More generally, however, an at-the-money option is an option whose exercise price is nearest to that of the underlying asset. For example, where an option has strike prices at intervals of 10p, e.g. 90p, 100p, 110p etc, if the underlying asset has a price of 97p, the at-the-money option is the 100p strike, which is the nearest strike price to the underlying price. See also In-the-Money.

Call Option

An option that gives the holder the right, but not the obligation, to buy an asset at a given price on or before a given date. See also Option.

Contract Size

The amount of the underlying asset which one futures contract represents, e.g. the contract size for a Copper contract is 25 tonnes. This means that underlying one Copper future is 25 tonnes of Copper which the investor has the obligation to buy (long future) or sell (short future).

Default

Failure by a party to fulfil its obligations on a future or option contract when they fall due, e.g. failure to meet a margin call, or to make or take delivery.

Delta

Drawn from the theoretical options pricing model (see Black Scholes), the delta of an option shows the rate of change in an option premium with respect to a change in price of the underlying asset or security. For example, the premium on an option with a delta of 0.5 will move by 0.5p for every 1p move in the price of the underlying. Delta can also be defined as either (i) the probability that the option will expire in-the-money, or (ii) the theoretical number of futures contracts of which the holder is either long (with a call option) or short (put option).

Exercise

The process by which an option holder takes up his or her right to buy (call) or sell (put) the asset underlying the option contract.

Futures Contract

A legal agreement to buy or sell a standard quantity of a specified asset for delivery at a fixed future date at a price agreed today. Futures are traded on futures exchanges, such as Liffe (London market), ICE Futures, ICE, EDX London or the London Metal Exchange. They

are available in a range of assets, such as wheat and copper and also on indices, such as the FTSE 100.

Futures Style Options Margining

Futures style options margining involves the premium paid on expiry/exercise, and does not involve the concept of Net Liquidation Value.

In-the-Money

When an option or warrant has intrinsic value, it is in the money. For a call option or a warrant, this is when the asset price exceeds the exercise price of the option. For example, a call option on a share with an exercise price of 100p when the share price is 110p is in the money. For a put option, it is when the exercise price exceeds the asset price. For example, a put option on a share with an exercise price of 100p when the share price is 90p is in the money.

Initial Margin

The returnable deposit paid to the Clearing House by the clearing member when entering into transactions on the cleared markets. The purpose of initial margin allows the Clearing House to hold sufficient funds on behalf of each clearing member to offset any losses incurred between the last payment of margin and the close out of clearing member's positions should the clearing member default. Initial margin is usually calculated by taking the worst probable loss that the position could sustain over a fixed amount of time, and can be paid in either cash or non-cash collateral.

Initial Margin Requirement

The size of deposit a member must lodge with the Clearing House to cover potential losses to the Clearing House in closing out the open positions in the event of a member defaulting.

LME

The London metal Exchange

London SPAN

Standard Portfolio Analysis of Risk, a margining system used by the Clearing House to calculate initial margins due from and to its clearing members for Liffe (London market), ICE Futures, LME, LCH EnClear and RepoClear positions. SPAN is a computerised system which calculates the effect of a range of possible changes in price and volatility on portfolios of derivatives. The worst probable loss calculated by the system is then used as the initial margin requirement.

Long Position

Any position which has been purchased. For example, a long futures position means that you have bought a future. Contrast with Short.

Lot

Another term for a contract.

Option

A contract which gives the holder the right, but not the obligation to buy or sell a specified asset at an agreed price on or before an agreed date in the future. The right to buy an asset is referred to as a call option. The right to sell is referred to as a put option.

Out-of-the-Money

A call option or warrant where the exercise price exceeds the asset price is out-of-the-money. For example, a call option on a share with an exercise price of 100p when the share price is 90p is out-of-the-money. A put option is out-of-the-money when the asset price exceeds the exercise price. For example, a put option on a share with an exercise price of 100p when the share price is 110p is out-of-the-money. See also In-The-Money and At-The-Money.

Portfolio

The current open positions held in any futures or options contracts. If all the contracts held are based on the same underlying asset then the portfolio is more correctly known as a contract family.

Position

A long or short market commitment, an obligation, or right, to make or take delivery.

Premium

The price paid to acquire an option.

Put Option

A contract which confers upon the holder the right, but not the obligation, to sell an asset at a given price on or before a given date.

Short Position

A term used to describe an open sold futures or options position. Also used to describe someone who sells a cash asset not previously owned. Contrast with Long (Position).

Variation Margin

The profits or losses on open positions which are calculated daily in the mark to market process and then paid or collected. Variation margin is usually calculated at the end of each business day (LIFFE/ICE Futures) by the Clearing House, and then collected the next

business day via the PPS system. Unlike Initial margin, which is kept by the Clearing House until a position is closed out or reaches expiry, variation margin is merely collected from the loss making side of the contract by the Clearing House, and then paid to the profit making side of the contract.

Volatility

A measure of the amount by which an underlying asset has moved or is likely to move.