Net Liquidating Value

Guide for Clearing Members

September 2018

Guide to Net Liquidating Value

1. Introduction

The aim of this document is to explain the concept of Net Liquidating Value (NLV) which is applied to premium-paid upfront options cleared by ICE Clear Europe (the "Clearing House"). Premium-paid upfront options (also known as Equity Style Options) are not margined in the same way as 'futures style options' where Variation Margin (VM) is paid and received on a daily basis.

NLV allows Clearing Members ("Member(s)") who are long premium-paid upfront options to receive a credit to the market value that is then used to offset Initial Margin ('IM') requirement within the member's account, flowing from both the options and positions in other contracts. The reason this can be done is because in the event of a Member default, these long options will be liquidated by the Clearing House and the prevailing market value realised. This can then be used by the Clearing House to mitigate the cost of closing-out the defaulter's position.

Members who are short premium-paid upfront options will be debited NLV so that the Clearing House is able to cover the cost of buying back any short option positions it may inherit in the event of a member default.

On a daily basis, the IM and NLV will be recalculated on both long and short option positions. The IM is calculated from the ICE Risk Model (IRM) and covers the Clearing House against adverse price moves of the option. The NLV is recalculated based on the settlement price of the option. Worked examples are provided to help illustrate how NLV is applied.

2. Margining Premium-Paid Up-front Options

An example of how margin on premium-paid up-front options is calculated is detailed below, from the viewpoint of both the buyer and the seller.

2.1. Buyer of an Option

On day of trade

- A Member buys an option (call or put).
- The buyer pays the option premium to the Clearing House, which is then in turn credited to the seller of the option on the day of purchase.

- IM is calculated using the ICE Risk Model at the end of each business day.
- As the buyer of the option, the NLV will be positive. This positive value is then used as a credit against the buyer's initial margin requirement, as the option is considered an asset which could be sold to offset any losses the Clearing House may incur in the event of a default. In almost all instances this credit will be greater than the IM requirement from the option itself and the remaining credit NLV is then used to cover any debit NLV requirement from short positions and to reduce the Member's IM requirement from positions in other contracts within the same Exchange. NLV represents the current value of this asset and is calculated using the following equation:

NLV = Settlement Price of Option x Contract Size x Number of lots

Trade date plus 1 (t + 1)

Case 1: Option price increases

- The price of the option goes up.
- Both IM and NLV are recalculated.
- In this case the option price has increased, and therefore the value of the NLV credit will have increased. This increased NLV credit will further reduce the member's total IM requirement, ceteris paribus.

Case 2: Option price decreases

- The price of the option goes down.
- Both IM and NLV are recalculated.
- In this case the option price has decreased, and therefore the value of the NLV credit will have decreased. This decreased NLV credit means there is less to offset the member's total IM requirement, ceteris paribus. Any shortfall in covering the rest of the member's IM requirement will need to be funded.

At Expiry Date

- If the buyer should choose to exercise his right to buy, or sell, his option at the strike price, a position in the underlying will be created at the strike price. This process is automatic in the case of European style options which expire "in the money" on the expiry date; holders of American style can choose to abandon or early exercise this type of option.
- At this point the NLV on the account becomes the Variation Margin (VM) on the underlying position (or Contingent Variation Margin for non-futures underlying).
- IM is now charged on the underlying position.
- As the option has now expired, the credit NLV becomes zero.

2.2. Seller of an Option

On day of trade

- A member sells an option (call or put).
- The seller receives the option premium from the Clearing House which in turn has received this from the buyer on the day of sale.

- Initial margin is calculated at the end of each business day.
- As the seller of an option the NLV will be negative and the seller therefore pays this NLV debit to the Clearing House, this is in addition to the IM. This is because if the seller were to default the Clearing House would inherit the short position and then close-out the option position by buying it back at the prevailing market value.

Trade date plus 1 (t + 1)

Case 1: Option price increases

- The price of the option goes up.
- Both IM and NLV are recalculated.
- In this case the option price has increased so the NLV is greater than on the previous day. The seller will pay this increase in debit NLV to the Clearing House.

Case 2: Option price decreases

- The price of the option goes down.
- Both IM and NLV are recalculated.
- In this case the option price has decreased so the debit NLV is lower than on the previous day resulting in reduced member's total NLV requirement

At Expiry Date

- If the option expires "in the money", the option will be exercised.
- IM is now charged on the underlying position.
- As the option has now expired, debit NLV becomes zero.
- If the option expired, no other payment would be due.

Please note NLV credits/debits are not calculated within the ICE Risk Model calculations, but are credited/debited to members' margin accounts via the ECS banking system. Clearing members can view NLV credits and debits via the Standing Requirements report (MBSR) distributed through MFT at End of Day. NLV is considered as a requirement (offset for NLV credit or liability for NLV debit)

3. Examples

3.1. Financials & Softs Contract

Consider a European call option on the FTSE 100 index with strike price 6000 and expiry date at t + 3 where t = 1 is today. The following trade is commenced at time t:

			BUYER				SELLER			
Date	Underlying Price	Option Price	Premium	IM	NLV	VM	Premium	IM	NLV	VM
0	6508	515	0	0	0	0	0	0	0	0
1	6520	540	-5150	-2565	5400	0	5150	-2565	-5400	0
2	6522	548	0	-2568	5480	0	0	-2568	-5480	0
3	6528	553	0	-2580	0	5530	0	-2580	0	-5530

Figure 1: Table showing the cash flows for the options trade described above (in GBP)

3.1.1. Buyer of the FTSE 100 option

Day 1

- The buyer pays an upfront premium of *515x10 = GBP 5,150* at trade initiation.
- The initial margin requirement of *GBP 2,565* is calculated using the ICE Risk Model and the buyer is debited that amount.
- The price of the option at the end of day is *GBP 540* and NLV is calculated as: *540 x 10 x 1 = GBP 5,400.*

For the buyer, this will always be a positive value, which is used as a credit to offset the buyer's IM requirement from the option position itself. All of the remaining NLV credit will be used to offset IM requirement flowing from positions in other contracts.

Day 2

- The option price has risen to *GBP 548.*
- IM is recalculated to *GBP 2,568* so an amount of *GBP 3* is debited.
- Credit NLV is now *548 x 10 x 1 = GBP 5,480* so *GBP 80* is credited to the buyer.

Day 3

- The option price rises further to *GBP 553* and IM is recalculated as *GBP 2,580* so *GBP 12* is charged.
- The option expires at the end of the day. The credit NLV becomes the VM on the futures position and will therefore no longer offset IM requirement from other contracts.

3.1.2. Seller of the FTSE 100 option

Day 1

- The seller receives an upfront premium of *GBP 5,150.*
- The IM is *GBP 2,565* and the seller is debited that amount.
- Debit NLV of *GBP 5,400* is also paid to the Clearing House. Debit NLV can be covered either with cash or acceptable non-cash collateral (see Acceptable Collateral on the ICE website).

Day 2

- IM is recalculated to *GBP 2,568* so *GBP 3* is debited.
- NLV rises to *GBP 5,480* so *GBP 80* is paid to the Clearing House.

Day 3

- IM is recalculated as *GBP 2,580* and *GBP 12* is charged.
- The option expires at the end of the day and the debit NLV becomes a VM loss on the futures position.

3.1.3. Profit and Loss

Figure 2 shows the Profit and Loss resulting from the options trade:

	Buyer	Seller
Premium	-5150	5150
Realised VM of exercised option	5530	-5530
Profit/Loss	380	-380

Figure 2: Table showing the profit and loss of the buyer and seller (in GBP)

The buyer makes a profit of *GBP 380* from the options trade, whereas the seller makes a loss of *GBP 380*.

3.2. Energy Contract

Consider a European call option on an EUA future. Figure 3 shows the cashflow arising from this option where t = 1 is today.

			BUYER				SELLER			
Date	Underlying Price	Option Price	Premium	IM	NLV	VM	Premium	IM	NLV	VM
0	6.75	1.2	0	0	0	0	0	0	0	0
1	6.84	1.27	-1200	-672	1270	0	1200	-672	-1270	0
2	6.94	1.35	0	-734	1350	0	0	-734	-1350	0
3	7.1	1.5	0	-796	0	1500	0	-796	0	-1500

Figure 3: Table showing the cash flows for the options trade described above (in EUR)

3.2.1. Buyer of an EUA option

Day 1

- Buyer pays an upfront premium of *1.2 x 1,000 = EUR 1,200* on the day of purchase.
- The initial margin requirement of *EUR 672* is calculated using the ICE Risk Model and the buyer is debited this amount.
- The price of the option at the end of day is *EUR 1.27* and NLV is calculated as: *1.27 x 1000 x 1 = EUR 1,270* which is credited to the buyer. For the buyer, this will always be a positive value, which is used as a credit to offset the buyer's IM requirement from the option position itself.

Day 2

- Option price has risen further to *EUR 1.35.*
- IM is recalculated to *EUR 734* so *EUR 62* is debited.
- Credit NLV has increased to *1.35 x 1,000 x 1 = EUR 1,350* so *EUR 80* is credited to offset the buyer's IM requirement.

Day 3

- The price of the option has risen further to *EUR 1.5* and the IM is recalculated and charged (*EUR 62).*
- As the option expires on this day, the credit NLV becomes the VM on the futures position and will therefore no longer offset IM requirement from other contracts.

3.2.2. Seller of an EUA option

Day 1

- Seller receives an upfront premium of *EUR 1,200.*

- IM requirement of *EUR 672* is debited from the seller.
- Debit NLV of *EUR 1,270* is also paid to the Clearing House. Debit NLV can be covered either with cash or acceptable non-cash collateral (see Acceptable Collateral on the ICE website).

Day 2

- Option price has risen to *EUR 1.35* and IM is re-valued (*EUR 62 of IM requirement* is debited).
- Debit NLV is recalculated to *EUR 1,350* and the increase of *EUR 80* from day 1 must be funded.

Day 3

- IM is recalculated and charged (*EUR 62*).
- As the option expires at *EUR 1.5* on this day, the debit NLV becomes a VM loss on the futures position.

3.2.1. Profit and Loss

Figure 4 shows the Profit and Loss resulting from the options trade:

	Buyer	Seller
Premium	-1200	1200
Realised VM of exercised option	1500	-1500
Profit/Loss	300	-300

Figure 4: Table showing the profit and loss of the buyer and seller (in EUR).

The buyer makes a profit of *EUR 300* from the options trade, whereas the seller makes a loss of *EUR 300*.

3.3. Additional Consideration

The diagram below illustrates the general treatment of the assets and liabilities such that:

1. VM losses can only be covered in cash.
2. NLV debit is covered with NLV credit, any remaining requirement is to be covered in cash and other acceptable non-cash collateral (see Acceptable Collateral on the ICE website).
3. Other IM requirements can be covered with NLV credit (if any remains), cash and other acceptable non-cash collateral.

Appendix - List of premium-paid upfront options

All Individual Equity and Index options are premium-paid upfront options. A full list of products for individual enquiries can be found in:

https://www.theice.com/products