Margining Styles for Options

Margin in derivatives trading refers to the collateral deposit required from the trading counterparties as a form of security to ensure contract fulfillment. The margining process encompasses measurement, calculation, and administration of the collateral associated with open positions. Margin includes initial margin and variation margin. Initial margin represents the collateral deposit that customers are obligated to provide when establishing and keeping an open futures or option position. For derivatives cleared by a clearing house, both long and short position holders are required to post initial margins. The initial margin requirement comprises two components: the risk component and the equity component. The risk component is determined by a historical simulation based expected shortfall approach at Nodal Clear. The equity component represents the net liquidation value (NLV) for equity-style margined options. Variation margin refers to the payment made between the counterparties due to the portfolio value change resulting from the market price movement. For derivatives cleared by a clearing house, the clearing house collects the variation margin from the clearing members with losing positions and pays the variation margin to the clearing members with gaining positions.

Equity-Style Margining (ESM)

Equity-style margining for options, also known as "premium-paid-upfront" margining, is a margining approach traditionally used for options contracts. Equity-style margining involves paying the option premium in full at the time of option purchase. The option premium is calculated based on the trade price.

Since the option premium is paid up front, the option becomes an asset for the option buyer and a liability for the option seller. As the option's market price fluctuates, the option's market value also fluctuates. The current market value of the option, also known as NLV, becomes a credit for net long positions and debit for net short positions. In the event of default of one party, the defaulter's counterparty realizes the NLV through liquidating the ESM options and uses it to offset other obligations from the defaulting party. The concept of NLV plays a crucial role in equity-style options and is calculated based on the market price of the option:

$$NLV = \text{Latest Option Price} \times \text{Contract Size} \times \text{Position Quantity}$$

A long option position holder receives an NLV credit and utilizes it as collateral against other obligations, such as initial margin requirements and NLV debit on short option positions. When the positive NLV of a long option position holder exceeds the initial margin requirement, the NLV credit is capped at the initial margin requirement amount. For short option position holders, there is an NLV debit, which must be covered by cash or collateral and this amount is in addition to the risk component of initial margin requirement.

Futures-Style Margining (FSM)

Options contracts with futures-style margining exhibit a similar cash-flow profile to futures contracts. When a buyer purchases an FSM option from the seller, the premium is not paid at the

time of transaction and there is no associated cash flow. Instead, each option open position is marked to market and has its variation margin amount calculated during the settlement cycle. The variation margin gain or loss from future-style margined positions is netted against the variation margin gain or loss from other positions in the portfolio to determine the total variation margin amount of the portfolio. The portfolio-level variation margin is settled during each settlement cycle. The total premium for a futures-style option is calculated and paid only on the day the option position is closed through exercise or expiration without exercise. The option premium is collected from the option buyer and paid to the option seller when the option contract is exercised or expires.

Example of Equity-Style Margining vs. Futures-Style Margining

Day 1: Suppose the option buyer purchased 1 lot of **Western Hub Real Time Peak Monthly Contract August 2023 Expiry $50 Call** at $2/MWh. The contract size is 368MWh per Lot. At the end of Day 1, the settlement price for the option is assumed to be $3/MWh[1]. The cash flow snapshot is shown in the following table.

Day 1 (1 Lot Trade at $2 and EOD Price at $3)	Equity Style Margining		Futures-Style Margining	
	Buyer	**Seller**	**Buyer**	**Seller**
Option Premium Payment	-$736	$736	$0	$0
Variation Margin	$0	$0	$368	-$368
Total Cash Flow from Variation Margin and Premium	-$736	$736	$368	-$368
NLV (Equity Component of Initial Margin)	$1,104	-$1,104	$0	$0
Risk Component of Initial Margin	-$515	-$1,207	-$515	-$1,207
Total Initial Margin	$0	-$2,311	-$515	-$1,207

For the ESM option in the above table:
- The buyer purchases an option and pays the option premium to the seller through the clearing house. Hence the buyer has a negative option premium payment, while the seller has a positive one.
- The ESM option does not have daily variation margin payments.
- Both the buyer and seller are charged the risk component of the initial margin. Nodal Clear employs an expected shortfall approach to calculate the risk component of the initial margin requirement, which results in a higher requirement for short option positions than that for long option positions.
- The option buyer holds a long option position and therefore a positive NLV, i.e., the equity component of the initial margin, which is more than enough to offset the risk component of initial margin, resulting in a total initial margin requirement of $0. If the option buyer

[1] Please note that in this example the FSM and ESM options are assumed to have the same settlement prices as the options has a short period until expiration and, as a result, there is a de-minimis impact from interest rate compounding of the option premium. An ESM option seller receives the premium upfront and can invest those proceeds, while an FSM option seller doesn't receive the option premium upfront and the investment proceeds and thus needs to be compensated through a higher premium price.

has other positions, the remaining NLV ($1,104 - $515) can be used to cover the initial margin from those positions. The option seller holds a short option position and therefore a negative NLV. Its total initial margin requirement is the sum of the negative NLV and the risk component. Note that negative total initial margin means that the party posts an initial margin to the clearing house.

For the FSM option in the above table:
- The buyer purchases an option and doesn't pay the option premium to the seller at the time of trade.
- As part of the end of day settlement process, the buyer has a variation margin gain of $368 from the price increase of $1/MWh.
- As is the case for the ESM option, the risk component of initial margin is charged for both the buyer and the seller.

Day 2: Suppose the settlement price for the option increases by $1/MWh to $4/MWh. The cash flow snapshot is shown in the following table.

	Equity Style Margining		Futures-Style Margining	
Day 2 (EOD Price at $4)	**Buyer**	**Seller**	**Buyer**	**Seller**
Option Premium Payment	$0	$0	$0	$0
Variation Margin	$0	$0	$368	-$368
Total Cash Flow from Variation Margin and Premium	$0	$0	$368	-$368
NLV (Equity Component of Initial Margin)	$1,472	-$1,472	$0	$0
Risk Component of Initial Margin	-$515	-$1,207	-$515	-$1,207
Total Initial Margin	$0	-$2,679	-$515	-$1,207

For the ESM option in the above table:
- NLV is recalculated to account for the change in the option's price. Any increase in NLV due to price increase reduces the total initial margin requirement of the buyer and increases it for the seller. Any decrease in NLV due to price decrease increases the total initial margin requirement of the buyer and reduces it for the seller.
- The risk component of initial margin is charged for both the buyer and the seller. Note that the risk components of initial margin are assumed to be the same on Day 2 as that on Day 1, though in reality price changes affect the calculation of the risk component of initial margin.

For the FSM option in the above table:
- The buyer has an additional variation margin gain of $368 from the price increase of $1/MWh.
- The risk component of initial margin is charged for both the buyer and the seller.

Day 3: Suppose the settlement price for the option increases by $1/MWh to $5/MWh and the option expires with automatic exercise. The cash flow snapshot is shown in the following table.

Day 3 (EOD Price at $5 and Option Exercise)	Equity Style Margining		Futures-Style Margining	
	Buyer	**Seller**	**Buyer**	**Seller**
Option Premium Payment	$0	$0	-$1,840	$1,840
Variation Margin	$0	$0	$368	-$368
Variation Margin from Exercised Positions	$1,840	-$1,840	$1,840	-$1,840
Total Cash Flow from Variation Margin and Premium	$1,840	-$1,840	$368	-$368
NLV (Equity Component of Initial Margin)	$0	$0	$0	$0
Risk Component of Initial Margin	$0	$0	$0	$0
Total Initial Margin	$0	$0	$0	$0

For the ESM option in the above table:
- As the option expires on this day, the settlement price of $5/MWh means that the settlement price of the underlying futures contract is $5 higher than the strike price. The buyer acquires the futures contract at the strike price and has an immediate variation margin gain of $1,840 from the price difference of $5/MWh between the trade price and the latest settlement price of the underlying futures contract. The opposite is true for the option seller.
- As the option has expired, there is no NLV or risk component of initial margin for either the buyer or the seller.
- Both the buyer and the seller are charged an initial margin on the resulting futures positions, which is not shown in the table above.

For the FSM option in the above table:
- The buyer has an additional variation margin gain of $368 from the price increase of $1/MWh.
- As part of the option exercise process, the buyer now pays the option premium to the seller based on the latest market value of the option at $5/MWh.
- As is the case for the ESM option, the buyer has an immediate variation margin gain of $1,840 since they acquire a futures position at the strike price.
- As the option has expired, there is no risk component of initial margin for either the buyer or the seller.
- Both the buyer and the seller are charged an initial margin on the resulting futures positions, which is not shown in the table above.

Summary

Overall, options with equity-style margining involve upfront payment of the premium by the buyer to the seller, while the premium payment happens during option exercise or expiration without exercise for options with futures-style margining. As a result, options with futures-style margining

have a more efficient funding requirement than options with equity-style margining. Throughout the lifecycle, price changes result in variation margin payments for options with futures-style margining during the daily settlement cycles in the same fashion as what occurs for futures, while the market value of options with equity-style margining is recognized as a credit or debit to the initial margin requirement without affecting the variation margin flow. In equity-style margining, the seller receives the premium upfront and can invest those proceeds, while a seller of futures-style margined options doesn't receive the option premium upfront and the investment proceeds and thus needs to be compensated through a higher premium price.