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STRESS TESTING ON OPTIONS

HKEX 香港交易所

Clearing Risk Management

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AGENDA

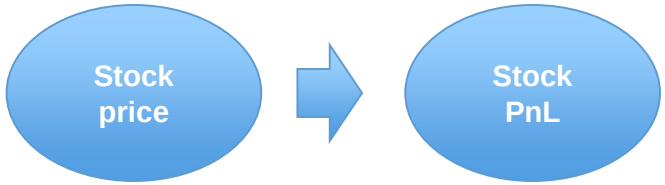
1. Background
2. Linear Products vs Non-Linear Products
3. Stress Testing Calculation and Implementation

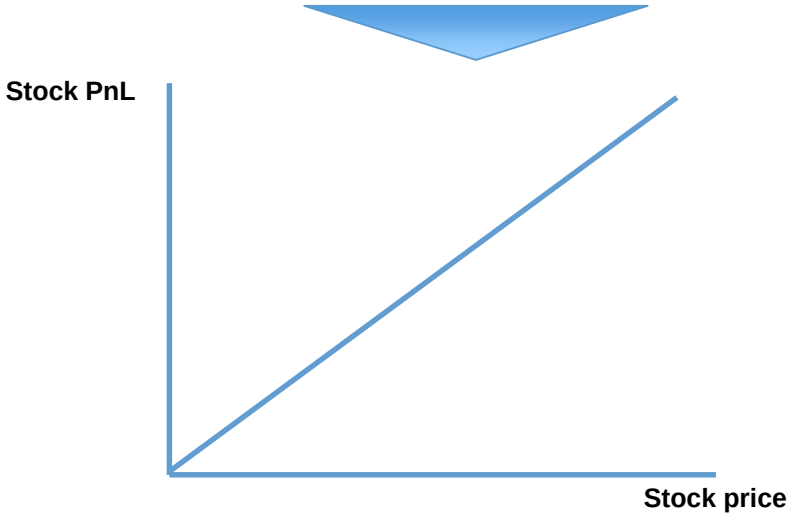
Overview

- Stress testing is the analysis / simulation technique widely used by institutions to evaluate the potential portfolio loss under extreme but plausible market condition.
- Most financial institutions use stress testing as a daily risk management tool e.g. set operational limits, allocate resources to ensure liquidity and capital adequacy for the aforesaid loss.
- Stress testing of non-linear products is crucial to Clearing Participants (CPs) as it tells CPs how the loss of non-linear products increases exponentially under extreme scenarios.
- CPs are strongly recommended to have proper stress testing in place for it's own or clients' exposure on HKEX's products, particularly on non-linear products such as option.

Linear vs. Non-Linear Products

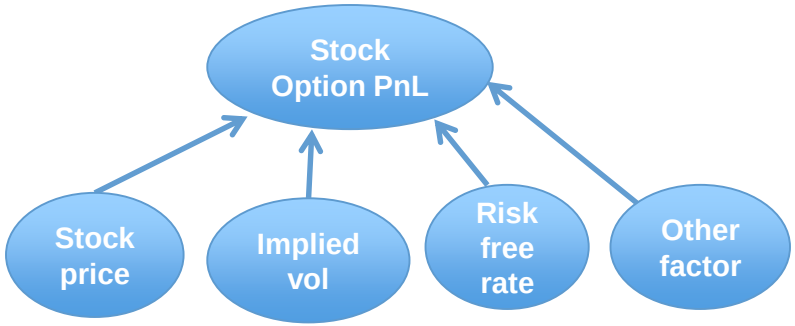
Linear

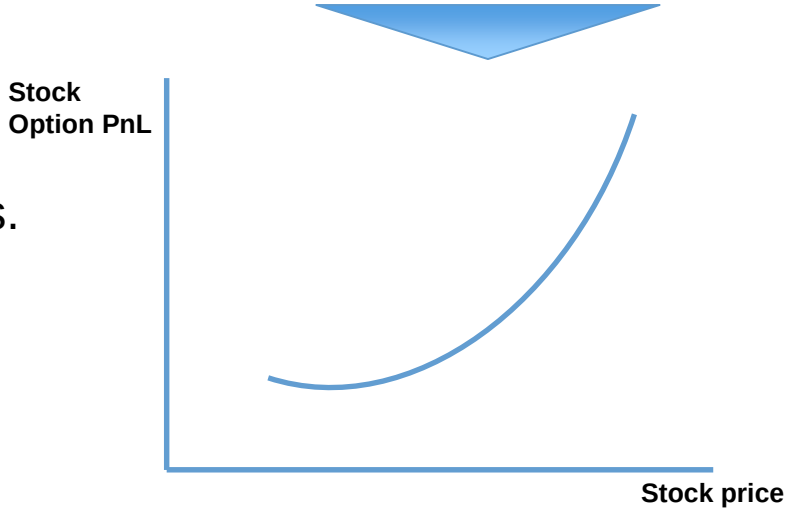




VS.

Non-Linear





- ***The change in risk exposure of option is exponential and subject to multiple risk factors, which is different from stock.***

Stress Testing Calculation

Example 1: Bullish view on China Life (2628) on 25 Oct 2018

- Short 1 China Life Oct18 put option at HK$15.5 strike price (x1000 shares)
- China Life closed at HK$ 17.1
- Margin Requirement is HK$ 316

	Profit and Loss in HK$	
Stock price movement assumption	**Short 1 put options at HK$15.5 strike price**	**Margin deficit per contract**
-9%	HK$ -320	HK$ -4
-15%	HK$ -1,010	HK$ -694
-22%	HK$ -2,140	HK$ -1,824

- Additional loss incurred during the positions close-out (3% or more in normal condition, see below)
- Bid-ask spread will further widen in the stress condition

Bid Orders				Ask Orders			
	Type	BQty	Bid	Ask	AQty	Type	
	LMT	50	0.55	0.58	106	LMT	HKGS
	LMT	200	0.55	0.58	200	LMT	HKOF
	LMT	200	0.55	0.59	50	LMT	HKIM(
	LMT	115	0.54	0.59	101	LMT	HKCT
	LMT	1	0.53	0.59	40	LMT	HKYK
	LMT	30	0.53	0.60	200	LMT	HKNH
	LMT	68	0.53	0.60	30	LMT	HKBN
	LMT	25	0.51	0.60	68	LMT	HKIB(
	LMT	25	0.41				

- ***Stress loss of short option is massively understated if treated like stock in stress calculation (Leverage effect)***

Stress Testing Implementation

Expectation of a proper stress testing framework

- CPs with significant activities in non-linear products are expected to implement and conduct stress testing regularly and at least on **a weekly basis**, to evaluate the potential loss of its portfolio under extreme but plausible market conditions.

- As a benchmark, the underlying movement adopted by clearinghouse under extreme but plausible market conditions is ± 20% (*for index options*) and ± 22% (*for stock options*).

- Proper stress testing policies and procedures should also be established to clearly set out the stress testing methodology, frequency and the review and escalation mechanism. For example, further analysis on client's exposure and proper follow-up is expected if there is an increasing trend in the potential loss.

- Each stress testing result produced by a CP should be compared with its latest liquid capital and liquidity to evaluate whether its latest positions are within its risk appetite. Such comparison should be documented in report of communications/correspondences.

Stress Testing Implementation

Stress testing can be implemented through in-house developed system, SPAN Risk Manager or some common market terminals. You can also contact your third party vendor for further information.