臺灣期貨交易所
TAIWAN FUTURES EXCHANGE

Disclosure of the Moneyness of Equity Options

Taiwan Futures Exchange
April 2020

Outline

- Purpose
- Calculation of the Moneyness of Equity Options
- Disclosure of the Information of Moneyness

Purpose

Current Practice

- In the situation of the contract adjustment[(1)] of an equity option, TAIFEX only adjusts its underlying while the exercise price remains unchanged.

  [Example]

  - Underlying: TSMC
  - Value of the Underlying Asset: 2,000 shares of TSMC
  - Exercise Price: TWD 100

After the contract adjustment due to a cash dividend of TWD 4.5 per TSMC share

  - Underlying: TSMC
  - Value of the Underlying Asset: 2,000 shares of TSMC + TWD 9,000
  - Exercise Price: TWD 100

- The method of the contract adjustment for all corporate events is the same, which is easy for investors to understand.

- However, as the exercise price is unchanged, the moneyness of an option contract is not easy to be assessed after the contract adjustment.

(1)For more information about the methodology of the contract adjustment, please visit: https://www.taifex.com.tw/file/taifex/CHINESE/2/股票選擇權契約調整方式介紹.ppt

Disclosure of the Moneyness

- To provide more information of equity options and enhance market participation, TAIFEX sets to disclose the moneyness of equity options for better meeting trading needs.
  - For an option contract with the contract adjustment, traders can quickly know the moneyness of the option without calculating value of the underlying asset. This will enhance the convenience for their trading.
  - The calculation of moneyness is similar to the current practice of the warrants market. Traders can easily and intuitively understand the information of moneyness. This can facilitate hedge and arbitrage from the market makers and traders of the warrants market.
- Scheduled on 8 June 2020, the moneyness is disclosed on the webpage of TAIFEX Real-Time Snapshot Quotes every 5 seconds from 08:45 to 13:45 each trading day.

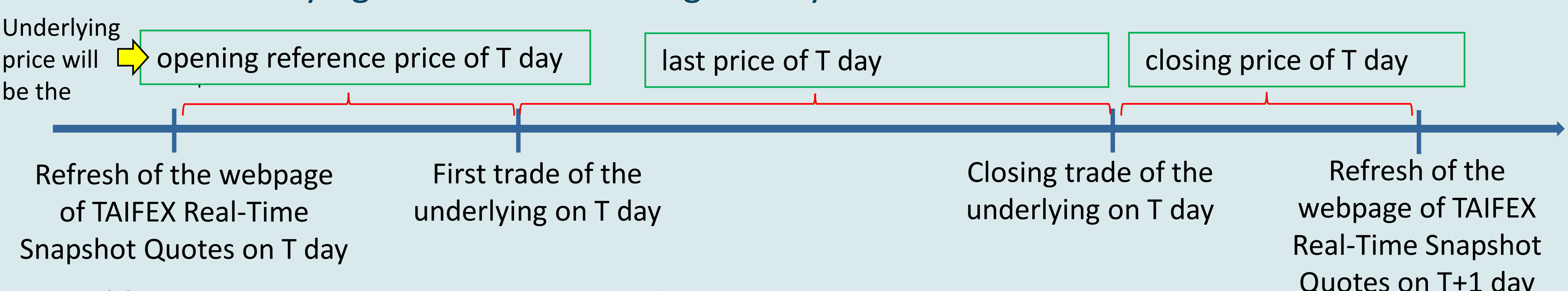
Calculation of the Moneyness

Calculation of the Moneyness

- Introduction of the Moneyness (Standard Option Conrtacts)

Calculation	Meaning	Display
Call：(S – K) / K * 100% Put：(K – S) / K * 100% where, K：Exercise Amount = exercise price* multiplier [(1)] S：Value of the Underlying Asset = underlying price* multiplier [(1)]	If value >0 : ⇨ In-The-Money (ITM) If value <0 : ⇨ Out-of-The-Money (OTM) If value = 0 : ⇨ At-The-Money (ATM)	ex: ITM 4.52% ex: OTM 3.68% ATM

- The Underlying Price for Calculating Moneyness



(1)For single stock options, the multiplier is 2,000; for ETF options, the multiplier is 10,000.

Meaning of the Moneyness

- If an option is in deeper OTM, it has higher leverage.
- If underlying price changes, the change of the premium return of an ATM option will be higher than that of an OTM or ITM option.
- If an option is in deeper ITM, the level change of its premium will be theoretically more identical to the level change of the underlying price.

Calculation of Value of the Underlying Asset under Corporate Events

- Standard contracts (no corporate event has happened since the option listed)
  - Value of the underlying asset = underlying price* multiplier

- If an corporate event happens, the option contract will be adjusted accordingly.
  - Value of the underlying asset will be determined as following rules.

Corporate Events	Value of the Underlying Asset After the Contract Adjustment	Effective Date
Distribution of Cash Dividends	underlying price*multiplier + cash dividends	ex-dividend date
Distribution of Stock Dividends	underlying price*multiplier*(1 + stock dividend ratio)	ex-right date
Cash Capital Increase (Secondary Public Offering)	underlying price*multiplier + fair value of subscription rights to participate in the cash capital increase	ex-right date

Calculation of Value of the Underlying Asset under Corporate Events

<table>
<tr><th colspan="2">Corporate Events</th><th>Value of the Underlying Asset After the Contract Adjustment</th><th>Effective Date</th></tr>
<tr><td rowspan="2">Mergers & Acquisition (The company will be a non-surviving company after a corporate merger)</td><td>Merging with a company that is or will be (on the effective date of the contract adjustment) the underlying of TAIFEX's equity options.</td><td>underlying price*multiplier*share transfer ratio + cash distribution</td><td rowspan="2">If merging with a new company, the effective date will be the date when the stock of the new company is listed. Otherwise, the effective date will be the date when the stock of the acquired company ceases to trade.</td></tr>
<tr><td>Others</td><td>The option contract will be delisted.</td></tr>
<tr><td colspan="2">Capital Reduction</td><td>underlying price*multiplier*capital reduction ratio + cash distribution</td><td>The date when the trading of the underlying securities is resumed.</td></tr>
</table>

Example – Distribution of Cash Dividends

- Underlying: Taiwan Semiconductor Manufacturing Co. (TSMC)
- Cash Dividends: TWD 4.5 per share (ex-dividend date is July 8)
- Exercise Price: TWD 120
- Effective Date of the Option Contract's Adjustment: July 8

	Adjustment of the Option Contract	Reintroduction of the Standard Option Contract
Contract Symbol	CDO → **CDA**	CDO
Value of the Underlying Asset	2,000 shares of TSMC **+ TWD 9,000**	2,000 shares of TSMC
Exercise Price	TWD 120 (unchanged)	TWD 120
Multiplier	2,000 (unchanged)	2,000
Contract Value	Premium x 2,000	Premium x 2,000

- Moneyness of the adjusted option contract if TSMC's price is TWD 100/share :
  - Value of the Underlying Asset (S) = TWD 100*2,000 + TWD 9,000 = TWD 209,000
  - Exercise Amount (K) = TWD 120*2,000 = TWD 240,000
  - Moneyness of the Call = (209,000/240,000) – 1 = -12.92% ⇨ OTM 12.92%
  - Moneyness of the Put = 1 – (209,000/240,000) = 12.92% ⇨ ITM 12.92%

Example – Distribution of Stock Dividends

- Underlying: CTBC Financial Holding Co. (CTBC)
- Stock Dividends: 0.05 shares per share (ex-right date is August 31)
- Exercise Price: TWD 24
- Effective Date of the Option Contract's Adjustment: August 31

	Adjustment of the Option Contract	Reintroduction of the Standard Option Contract
Contract Symbol	CNO → **CNA**	CNO
Value of the Underlying Asset	**2,100** shares of CTBC	2,000 shares of CTBC
Exercise Price	TWD 24 (unchanged)	TWD 24
Multiplier	2,000 (unchanged)	2,000
Contract Value	Premium x 2,000	Premium x 2,000

- Moneyness of the adjusted option contract if CTBC's price is TWD 20/share :
  - Value of the Underlying Asset (S) = TWD 20*2,100 = TWD 42,000
  - Exercise Amount (K) = TWD 24*2,000 = TWD 48,000
  - Moneyness of the Call = (42,000/48,000) – 1 = -12.5% ⇨ OTM 12.5%
  - Moneyness of the Put = 1 – (42,000/48,000) = 12.5% ⇨ ITM 12.5%

Example – Distribution of Stock Dividends and Cash Dividends

- Underlying: Taiwan Cement Corporation (TCC)
- Stock and Cash Dividends: 0.1 shares and TWD 1.5 per share (ex-right date is July 26)
- Exercise Price: TWD 32
- Effective Date of the Option Contract's Adjustment: July 26

	Adjustment of the Option Contract	**Reintroduction of the Standard Option Contract**
Contract Symbol	DFO → **DFA**	DFO
Value of the Underlying Asset	**2,200** shares of TCC **+ TWD 3,000**	2,000 shares of TCC
Exercise Price	TWD 32 (unchanged)	TWD 32
Multiplier	2,000 (unchanged)	2,000
Contract Value	Premium x 2,000	Premium x 2,000

- Moneyness of the adjusted option contract if TCC's price is TWD 28/share :
  - Value of the Underlying Asset (S) = TWD 28*2,200 + TWD 3,000 = TWD 64,600
  - Exercise Amount (K) = TWD 32*2,000 = TWD 64,000
  - Moneyness of the Call = (64,600/64,000) – 1 = 0.94% ⇨ ITM 0.94%
  - Moneyness of the Put = 1 – (64,600/64,000) = -0.94% ⇨ OTM 0.94%

Disclosure of the Information of Moneyness on TAIFEX's Webpage

TAIFEX's Real-Time Snapshot Quotes

- https://info512.taifex.com.tw/EN/OptQuote_Norl.aspx

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CALL | 2330(CDO) | 202004 | PUT

Bid	Ask	Last	Change	TtlVol	Time	Moneyness	Strike	Moneyness	Bid	Ask	Last	Change	TtlVol	Time
		--	--	--		ITM 14.89%	235.0	OTM 14.89%	235.0	0.020		--	--	
32.700	34.300	--	--	--		ITM 12.50%	240.0	OTM 12.50%	240.0	1.270	1.770	1.340	-0.780	10:24:12
28.200	29.900	--	--	--		ITM 10.20%	245.0	OTM 10.20%	245.0	2.040	2.360	2.200	-0.870	10:23:02
24.100	25.600	24.900	4.100	1	10:11:36	ITM 8.00%	250.0	OTM 8.00%	250.0	2.640	3.180	--	--	
16.600	17.900	--	--	--		ITM 3.85%	260.0	OTM 3.85%	260.0	4.960	5.850	5.850	-1.900	10:11:39
10.350	11.350	11.000	2.300	2	11:11:18	ATM	270.0	ATM	270.0	9.000	9.700	9.900	-2.700	10:11:37
5.750	6.700	5.950	0.900	5	09:21:45	OTM 3.57%	280.0	ITM 3.57%	280.0	13.750	15.200	--	--	
2.940	3.730	3.130	0.420	6	11:02:09	OTM 6.90%	290.0	ITM 6.90%	290.0	20.600	22.200	--	--	
1.310	1.600	1.350	0.000	1	09:29:52	OTM 10.00%	300.0	ITM 10.00%	300.0	28.900	30.400	--	--	
0.450	0.940	--	--	--		OTM 12.90%	310.0	ITM 12.90%	310.0	37.900	39.500	--	--	
	0.550	--	--	--		OTM 15.63%	320.0	ITM 15.63%	320.0			--	--	
	0.250	--	--	--		OTM 18.18%	330.0	ITM 18.18%	330.0			--	--	

Moneyness Information

*The value of moneyness is rounded to 2 decimal places

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Thank you

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